

Aspects of Aspectual Verbs in  
English and Russian

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**Declaration**

I declare that this thesis has been composed by myself and that the research reported here has been conducted by myself unless otherwise indicated.

Edinburgh, 15th May 1995

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## Abstract

This thesis develops a theory of aspectual interpretation based on a representation of eventuality reference which is implicit in any sentence uttered in natural language. Language users categorise real world events into various types, termed aspectual class, and these event types can be identified by diagnostic tests, which rely on inferences between sentences and co-occurrence with certain temporal adverbials and other aspectual forms. After the introductory Chapter 1, these tests are presented in Chapter 2.

The thesis gives an analysis of aspectual verbs (such as *start*, *finish* and *continue*) within the aspectual theory, which provides an interpretation for various aspectual phenomena, such as aspectual class (represented in the form of event templates, also presented in Chapter 2), and perfective and imperfective aspect (termed viewpoint aspect after Smith 1991). Examples are taken from English and Russian, and the final representation gives an intermediate level of analysis which highlights equivalent interpretations in the two languages for aspectual meanings which are expressed in different ways syntactically and morphologically. The theory takes the approaches of Smith (1991) and Moens (1987) as a starting point, incorporating insights from both to motivate a set of event phases (such as initial bound, process, final bound, culmination phase, etc) which are employed in various configurations to form the event templates.

Smith's two-component theory (comprising aspectual class and viewpoint aspect) forms the central core of the analysis, in which viewpoint aspect explicitly describes part of the event template, and is the main topic of Chapter 3. Aspectual verbs can be analysed in a similar way, and this analysis is developed in Chapter 5. Chapter 4 develops a more detailed account of one of the aspectual classes, culmination expressions, which is motivated by linguistic data, but also facilitates the theory of aspectual verbs which follows in Chapter 5. Viewpoint aspect can also be applied to aspectual verbs, and in this sense they constitute a third-component of an aspectual theory. The event templates are in part motivated by this fact, and the analysis unfolds so that viewpoint aspect can be applied to the interpretations of aspectual verbs. The final analysis, therefore, shows how the various components of eventuality reference interact, offering a unified account of aspectual phenomena, with a straightforward analysis of aspectual verbs not offered by Smith or Moens.

The feature-structure style framework which is developed and employed throughout the thesis follows in the spirit HPSG (Pollard and Sag 1994). The main coverage of HPSG is of syntactic issues with indications of how semantics could be incorporated. This thesis shows how a semantic interpretation of aspect can be given within this framework.

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Chasto ya dumal, chto ne dopishu etu dissertatsiyu... a teper' dopisal.

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# Chapter 1

## Introduction

It is unclear what constitutes an event in the real world. A person's arrival to a house, the event of writing a letter, walking around town, or jumping for joy are all descriptions of happenings in the world which might be described as events. They might even be described as separate events in their own right, but which in combination are idealised in language as a single unit or event. For example, *John arrived* describes an event which might include getting out of a car, walking to the front door and ringing a bell. And each of these event descriptions in turn can be broken down and described with finer granularity: at another level of description walking can be seen as consisting of lifting a leg, putting it in front of the other leg, lifting that leg, etc. The words of a language allow speakers to categorise their experiences of the world at any level of granularity.

In classical descriptive grammars it is said that every verb describes an action and these descriptions of actions reflect how the language user perceives events in the world. Natural languages consist of words and phrases which combine according to a set of rules to produce felicitous sentences. Phrases can be categorised in various ways, according to their syntactic or semantic function, and this thesis provides a detailed study of the semantic interpretation of event reference in natural language. The infinite number of events in the world are idealised as units when they are referred to in sentences, and each event reference belongs to a particular event type (or aspectual class). A description of an event in language corresponds to a particular (or postulated) event in the real world when it is uttered in a context in which that event can be identified.

(1.1) John arrived.

(1.2) John wrote the letter.

(1.1) and (1.2) refer to events which are complex in the world, but presented as a single entity in the English language, ie an arrival, or an event of writing a letter. (1.1) is perceived as taking a relatively short length of time, while (1.2) has duration. Such characteristics of events can be identified by the way event descriptions are used in language. It turns out that events (or, to include references to states, eventualities) can be categorised into four or five different types, reflecting the relative duration of

an event, the type of end or conclusion it has, etc. These types have been classified in the literature and termed **aspectual class** and **Aktionsart**, with varied terminology for the types; I use Moens' terminology, identifying the following aspectual classes: culmination, process, culminated process, point and state. In the thesis, I focus mainly on the first three categories. Linguistic tests to show this categorisation are given in Chapter 2.

Events can also be referred to from different **points of view**. For example, (1.3) contrasts with (1.4) in that the former does not imply that the letter is finished, while the latter does. The focus on different parts of events is facilitated by various aspectual categories, indicating whether an event is ongoing or complete (relating to, eg, the imperfective and perfective aspects, or **viewpoint aspect**), whether it has started or stopped (relating to **aspectual verbs**), etc.

(1.3) John was writing the letter.

(1.4) John wrote the letter.

There is an extensive literature which discusses and theorises about aspectual class and other aspectual categories. The main aim of this thesis is to evaluate a number of approaches to analysing these natural language categories for referring to events, independently motivate a set of event templates to represent the categories, and provide a framework to give a unified account of various aspectual phenomena, such as viewpoint aspect and aspectual verbs.

The aim is to give an account which provides the correct interpretation for the following data in English, and the corresponding data in Russian.<sup>1</sup>

(1.5) John started to write the letter. *Ivan nachal pisat' pis'mo.*

(1.6) John was writing the letter. *Ivan pisal pis'mo.*

(1.7) John stopped writing the letter. *Ivan perestal pisat' pis'mo.*

(1.8) John resumed writing the letter. *Ivan prodolzhit pisat' pis'mo.*

(1.9) John continued writing the letter. *Ivan prodolzhal pisat' pis'mo.*

(1.10) John finished writing the letter. *Ivan konchil pisat' pis'mo.*

(1.11) John had written the letter. *Ivan (uzhe) napisal pis'mo.*

(1.12) John wrote the letter. *Ivan napisal pis'mo.*

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<sup>1</sup>Here I give a rough Russian equivalent of the English in the right hand column, without giving a full gloss. Throughout the thesis complete glosses and translations are given for all Russian examples.

Examples (1.6), (1.11) and (1.12) are, respectively, in the **progressive, past perfect and simple aspect** (in the English examples), and the **imperfective and perfective aspects** (in the Russian examples). These categories are referred to as viewpoint aspect, after Smith (1991), rather than the traditional general term 'aspect'. The other examples have aspectual verbs as the finite verb and are in the simple aspect in English (and mostly perfective in the Russian examples). Each one refers to a different part of the *writing*-event, and in this sense refers to the unfolding of the event from a different point of view. An analysis is developed in this thesis to account for these two kinds of aspectual reference.

For the aspectual verbs, depending on the aspectual class of the complement verb, certain of the aspectual verbs may not be available, for example, *?John finished walking in the park* sounds odd,<sup>2</sup> while *John started/stopped walking in the park* are okay. The make-up of the event templates for each of the aspectual classes reflects these differences in interpretation.

Having developed an account for viewpoint aspect and aspectual verbs, I show that certain inferences can be predicted to hold between pairs of sentences. The inferences reflect a temporal relationship between two of the example sentences. For example, where ' $\rightarrow$ ' indicates an inference:

(1.13) John had started writing the letter.  $\rightarrow$  John was writing the letter.  
(at some point)

(1.14) John had finished the letter.  $\rightarrow$  John has written the letter.

(1.15) John stopped writing the letter.  $\nrightarrow$  John finished the letter.

These inferences can be derived from the feature structure analysis, and are discussed in Chapter 5.

The starting point for the analysis are the theories of Smith (1991) and Moens (1987), who both provide a unified account of various aspectual phenomena. Smith's two-component theory of aspect identifies the aspectual class of sentences (her situation type), representing them as situation schema, and interprets aspect (her viewpoint aspect) as focusing on part of the situation schema. This analysis is reformulated slightly by motivating a more detailed representation of the situation schema in terms of event phases and event templates. This is motivated in part by the structure of Moens' tripartite event nucleus.

## Outline of the chapters

In **Chapter 2**, a battery of tests is introduced to identify the set of **aspectual classes** which are represented in terms of **event templates**. The templates comprise **event phases**, some of which are common to a number of event templates. These tests rely on intuitions on the interpretation of example sentences with certain

temporal adverbials (eg, *at 2 o'clock*, *for 2 hours*, *in 2 hours*). A detailed analysis is not given for temporal adverbials, since they provide the basis for the tests. However, the nature of the event phases (representing extended periods of time, or points of time) would allow the interpretation of these adverbials within the framework.

The event templates are cast in an HPSG-style framework (compare Pollard and Sag 1994) using feature structures, which is extended in later chapters to allow the relationship between the semantic interpretation of aspect and the morpho-syntactic structure of the sentences to be shown. Event templates are motivated for English and Russian, and it is shown that the same aspectual classes can be identified in both languages.

**Viewpoint aspect** is discussed in **Chapter 3**. Viewpoint aspect is interpreted as focusing on part of the event template. The interpretation of viewpoint aspect in English and Russian is similar, and comparisons between the interpretations in the two languages are made. However, viewpoint aspect is expressed differently in the two language on a syntactic and morphological level. The feature structure analysis provides a framework in which to demonstrate that the same aspectual interpretation for viewpoint aspect can be derived from different syntactic and morphological structures. The analysis provides a basis with which to compare the categories in the two languages.

In the first part of Chapter 3, the interpretations of viewpoint aspect in English and Russian are discussed. In English, interpretations for the **simple, perfect and progressive aspects** are identified. The perfect is traditionally analysed as a tense form, but following Moens, I show how it can be interpreted as a viewpoint aspect. In Russian, interpretations are discussed for the **perfective and imperfective aspects**. All examples are given in the past tense, assuming a temporal interpretation whereby events (or parts of events) take place prior to the time the sentences are uttered. Interpretations are discussed for examples referring to single occurrences of events, and an indication is given as to how references to iterated events could be accounted for in the analysis. While there is not a one-to-one mapping of the interpretation of viewpoint aspect in the the two languages, I show that for single event readings, the progressive and imperfective have equivalent interpretations. The relationship between the simple and perfect in English with the perfective in Russian is slightly more complicated. Both the simple and perfect have some characteristics of the perfective, but the detail of the event templates allows their interpretations to be distinguished.

**Chapter 4** focuses on one of the aspectual classes: **culminations**. A more detailed analysis is made to account for this event type. Culminations are usually considered to be punctual events, and this is reflected in the structure of the event phases introduced up to this point. However, in certain contexts culminations can be perceived as having duration, and a secondary level of structure is proposed to reflect this. This level of structure is derived from the same event phases used for other aspectual classes, which allows the analysis with viewpoint aspect to be carried across unchanged for culminations.

The analysis in Chapter 4 also provides the last necessary detail of the ontology

<sup>2</sup>Unless he has a particular route marked out and has come to the end of this, but walking in a park is usually associated with a more aimless kind of wandering.

in order to extend the analysis to **aspectual verbs** in **Chapter 5**. Like viewpoint aspect, aspectual verbs focus on part of the event referred to, explicitly describing certain event phases of the template. The analysis is again derived from the individual components of the sentence, showing the relationship between the syntactic or morphological structure of the example sentences, and the semantic interpretation for aspect. The incorporation of aspectual verbs into the framework completes the analysis by showing how the aspectual theories of Smith and Moens can be extended in a principled way to account for this aspectual phenomenon. Finally, the robustness of the analysis is tested by showing how inferences like those in (1.13)–(1.15) can be derived from the representations for the individual sentences. This suggests how the interpretations proposed in this thesis could be used to make judgements about the relationship between events described in separate sentences, and therefore make judgements about the coherence of discourse.

## Chapter 2

# Aspectual Class and the Structure of Events

### 2.1 Introduction

The aim of this chapter is to determine a set of event types which are used in natural language to refer to events in the real world. These event types have been referred to in the literature as aspectual classes, Aktionsarten and situation aspects, amongst other names.

A set of aspectual classes will be motivated and used as the basis for the analysis of aspectual phenomena. The aim of this analysis is to provide a framework within which to represent viewpoint aspect, aspectual verbs and various nuances of aspectual class. The discussion in this chapter will draw on a number of classifications, highlighting their differences and similarities and drawing them together to motivate the set of event templates proposed in section 2.4. These templates extend the nucleus proposed in Moens (1987) and makes more precise the schemata proposed in Smith (1991), bringing together concepts in each of the proposals to show how different parts of the templates are related to other parts. Smith's and Moens' approaches are brought together to provide a more detailed ontology of event structure, leading into an analysis of viewpoint aspect with this ontology serving as the base, and paving the way to give a straightforward account of aspectual verbs.

Vendler (1967) classified events (or aspectual class) into three categories and identified a category of states, which Vendler associated with individual verbs. This classification has been used in various guises, but most importantly, Dowty (1979) shows that the aspectual class of a verb phrase or sentence can differ from that associated with the verb. For example, the sentence with the transitive verb *write* (eg, *John wrote the letter*) is an accomplishment, while the intransitive *write* (eg, *John wrote, and wrote*) indicates an activity. The plurality of subject and object noun phrase can also affect the aspectual class of a sentence. For example, *John wrote letters* is an activity expression, while *John wrote the letter* is an accomplishment. These differences in aspectual class can be influenced by various features, and there is an extensive literature on the derivation of the aspectual class from the components of

a verb phrase. Verkuyl (1972), for example, offers a syntactic approach to composing the aspectual class of a verb phrase; Dowty (1979) attempts to give a semantic interpretation. Moens (1987) incorporates the derivation of the aspectual class into his aspectual network, showing valid transitions between aspectual classes which operate as functions.

In this chapter, I shall present some linguistic tests to identify each of the aspectual classes. The event templates will then be motivated from the different qualities identified for each of the aspectual classes, indicating the nature of the start, end and internal structure of the events referred to. They are made up of event phases, which allow comparisons to be made between each of the aspectual classes, since some phases are common to more than one aspectual class. The additional features and structures proposed for my templates allow for a broader account of aspectual phenomena including, in particular, aspectual verbs, which Smith treats as a special case and Moens does not account for. The templates introduced in this chapter will form the background for the analysis of viewpoint aspect in Chapter 3, a more detailed analysis of culmination (or achievement) expressions in Chapter 4, and an account of aspectual verbs in Chapter 5.

The set of aspectual classes highlights distinctions between events such as their perceived length, giving distinctions regarding durativity of an event versus instantaneity; whether the event can be said to have taken place throughout its duration, or whether it exists as a completed event only when it is ended. These classes are identified by the behaviour of verb phrase expressions and other phrases (like goal-oriented prepositional phrases, for example) with certain temporal adverbials. In section 2.2.1, the characteristics of event types are discussed for English. The discussion on Russian event types is held back until section 2.2.3, when more technical details are in place. In section 2.2.2, the event types are distinguished by a battery of tests collated by Dowty. This motivates Vendler's classification, which forms the basis of the set of aspectual classes which I use throughout the thesis. This set is compared with Moens' classification (section 2.3.1) which builds on Vendler's and introduces a complex entity (a tripartite event nucleus associated with the event classification). A critique is made of the details of this entity which is then extended separately for each of the aspectual classes, giving a separate template with each of the constituent parts motivated by the linguistic data. Smith's situation schemata, which also follow the Vendlerian tradition, are introduced (section 2.3.2) and compared with the proposed event templates (introduced in section 2.4). Having set up a classification for event reference in English, I turn to Russian, motivating a classification for Russian sentences (section 2.2.3). This consists of a similar battery of tests as that used for the classification of English event reference, and is compared with the English classification, aided in part by the template representation. To conclude the chapter, I show how the proposed event templates for English and Russian can be represented in a feature structure style framework (section 2.5), providing a basic event representation which can be used for an HPSG-style account of tense and aspect. This provides a more formal representation of what has been discussed previously.

## 2.2 Different approaches to classifying aspectual class

Distinctions between different kinds of events in language have been observed since Aristotle, and this has been developed with more relevance to linguistic investigations in terms of tense and aspect since the middle of this century. For example, by Ryle (1949) and Kenny (1963). Vendler's classification of event types or aspectual class (Vendler 1967) grew out of this work. His terminology has been employed most widely in the literature, and he identified the four types of eventuality achievements, activities, accomplishments and states. Aspectual class, sometimes called *Aktionssart*, can be broken down into conceptual parts in various ways, often given in terms of boolean features. Each feature carries a particular concept relating to the nature of the event structure. In section 2.2.1, I review some of these features and in section 2.2.2 I discuss how they are related to Vendler's classification of aspectual class. Following this, the battery of tests is presented to distinguish the classes as linguistic categories, ie, the categories relate to the perception of event structure in linguistic use, rather than the actual make-up of events in the real world, although there is a close connection between the two.

The attraction of the account is the way they break down the problem into intuitive parts (which I term event phases), motivated by linguistic data. Any further specification of internal structure which I make will similarly be motivated by the claim that the concept has an abstract realisation by the fact that it can be referred to linguistically.

### 2.2.1 Distinguishing features of event types

The oppositions given in Figure 2.1 (ie, state vs event, punctual vs durative, telic vs atelic) are oppositions which are often cited in the literature (eg, Comrie 1976, Bach 1986, etc), and they relate back to distinctions which Aristotle made. They are also fundamental distinctions recognisable in Vendler's categorisation, and which correspond to certain event phases or combinations of these in the event templates motivated in section 2.4. The terminal nodes in Figure 2.1 correspond to Vendler's aspectual classes, which will be described in more detail in section 2.2.2, and adopted as the basis of the event ontology in this thesis.

#### 2.2.1.1 Telic vs atelic events

Telic events are directed towards a goal, and when the goal is reached, a change of state occurs and the event is perceived as having reached its ultimate conclusion and is complete. This differentiates examples like *John wrote a letter* from *John played in the garden*, the former finishes when the letter is complete: *John finished writing the letter*, whereas the latter has no particular end points and can stop at any time: *John stopped playing in the garden* vs ??*John finished playing in the garden*. These categories related to the aspectual classes accomplishment and achievement respectively (termed culminated process and process by Moens 1987, introduced in

section 2.3.1). Both these events are durative. Smith also identifies the punctual event achievement (eg, *John arrived*) as a telic event (Smith 1991: 30), and this is in contrast to an atelic punctual aspectual class of semelfactives (eg, *John sneezed*). Telicity represents a change of state either into a durative event or into a new state. Achievements (or culminations in Moens' terminology) are argued to represent a change of state which have consequences, identified by Moens as those events which are felicitous with the perfect: *John had arrived* is okay by ??*John had sneezed* sounds odd. Semelfactives (or point events in Moens' terminology) do not have natural consequences and the perfect sounds odd, eg ??*John had sneezed*, unless the consequences are inferred by a particular context, in which case the perfect sounds okay, as Sandström (1993) argues.

### 2.2.1.2 Durative vs instantaneous events

The durative/instantaneous distinction reflects a perception about the relative duration of an event but is essentially a linguistic category which is identified by the co-occurrence of certain adverbials with a given event expression. Duration is relative, and can be of any temporal length specified, for example, by a temporal adverbial. *John wrote the letter* can, for instance, refer to an event taking ten minutes or ten days, depending on all sorts of world knowledge information about the length of time it usually takes John to write a letter, how long the letter is, and whether or not the length is specified in the context. This information is often provided in the context by a temporal adverbial, or is inferred from the context. The durative/instantaneous distinction therefore indicates relative length or shortness of time, contextual information providing the precise length of time (in terms of conventional measures of time) for any given event.

An event of arriving may take a couple of minutes, or a few seconds, but is categorised as an instantaneous event for linguistic purposes. The tests in section 2.2.2 will demonstrate this. An *at*-adverbial is felicitous with such event references which present the event as if it is instantaneous, eg *John arrived at 2pm*. This distinction, which can be characterised as [DURATIVE  $\pm$ ], differentiates achievements and point events from accomplishment and activity events.

### 2.2.1.3 States vs events: statics vs dynamics

The final branch of Figure 2.1 is that between events and states. This corresponds to Aristotle's *energia/kinesis* distinction, which is usually incorrectly ascribed to the telic/atelic distinction (Mourelatos 1993<sup>1</sup>). Intuitively, states obtain over time, holding regardless of surrounding events. They may stop and start, but in terms of linguistics interpretation are usually perceived as holding before and after the time at which they are explicitly described. For example, *John loved Mary on Monday* holds during the described reference time (indicated by the temporal adverbial, *on Monday*). But there is an inference that he loved her before and after that time,

unlike an event reference such as *John played in the garden on Monday*, which is inferred as taking place at some time on that day, and being confined to some time within that temporal period. This distinction will also be drawn out by the tests presented in section 2.2.2.

## 2.2.2 Vendler's classification and Dowty's battery of tests

Vendler (1967) proposes four conceptual classes of events in natural language, making the distinctions by showing what aspectual forms (such as progressive aspect, or temporal adverbials like *in*- and *for*-adverbials) can co-occur with each of the classes, and by providing entailment relations as tests (for example, accomplishments are distinguished from achievements by noting that if *John was writing the letter* it is not necessarily true that *John wrote the letter* [accomplishment] in contrast to the observation that if *John was playing in the garden* then it is true that *John played in the garden* [activity]). The four types of event are: achievement, accomplishment, activity and state reflecting the categories identified in Figure 2.1. Dowty (1979) presents a battery of tests which provides a reasonably comprehensive set of criteria for distinguishing these aspectual classes. Dowty 1979: 54 gives examples of Vendler's four categories shown in Figure 2.2.

I present Dowty's tests in the following sections, and use them as a means of distinguishing the aspectual class of expressions, that is verb, verb phrase, and sentence expression. As was noted above, the aspectual class of an expression can change according to various features (such as transitivity, presence or absence of prepositional phrases, plurality of the subject or object noun phrases). The tests are equally applicable to Moens' classification (section 2.3.1), which corresponds to the Vendlerian classification. His terminology differs from Vendler's and is more transparent in that it is chosen to reflect the internal structure of the events referred to. The same tests will also be used when I present examples from Russian to identify the set of aspectual classes in that language (section 2.2.3), demonstrating that the categories identified are valid not just for English. I take examples from English and Russian, but others have demonstrated the existence of these categories for other languages (eg, Smith 1991 presents data from these two languages plus French, Chinese and Navajo; Cochrane 1977 presents tests for Serbo-Croat).

In the following sections, I use abbreviations to indicate the aspectual class of the examples. These are ACH for achievements, ACT for activities, ACC for accomplishments, and STA for states.

### 2.2.2.1 States and achievements vs activities and accomplishments

States and achievements are distinguished from activities and accomplishments by the progressive test: the former do not permit the progressive:

<sup>1</sup>Thanks to Carlota Smith for alerting me to this paper.



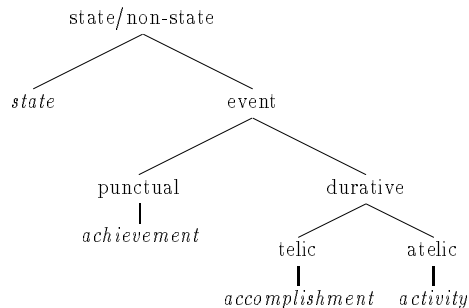


Figure 2.1: Event hierarchy showing the relationship between aspectual classes

States	Activities	Accomplishments	Achievements
know	run	paint a picture	recognise
believe	walk	make a chair	spot
behave	swim	deliver a sermon	find
desire	push a cart	draw a circle	lose
love	drive a car	recover from illness	reach

Figure 2.2: Examples of Vendler's aspectual classes

- (2.1) a. \*John was knowing the answer. (STA)  
 b. \*John was recognising the painting. (ACH)  
 c. John was running. (ACT)  
 d. John was painting a picture. (ACC)

Dowty notes that not all achievements rule out the progressive (eg *John was reaching the top of the mountain* is acceptable in certain contexts) and this observation is used in Dowty (1986) to undermine the distinction between achievements and accomplishments, which is not necessary in that paper since the effect of aspectual class on the temporal interpretation of discourse is at issue. However, there are other tests which distinguish between these two classes on a sentence level, and therefore two separate classes for achievements and accomplishments are maintained. At this stage, I shall assume the progressive is not acceptable with achievements, but in Chapter 4, this will be challenged and the representation for achievements (or culmination expressions in Moens' terminology) will be modified.

#### 2.2.2.2 Activities and accomplishments

Activities and accomplishments are distinguished by the kind of temporal adverbial they accept, and the different entailments which follow from the presence of the adverbials. Activity verbs take a *for*-adverbial but do not take *in*-adverbials. Accomplishment verbs take *in*-adverbials but only marginally take *for*-adverbials, if at all.

- (2.2) a. ?John painted a picture for an hour.  
 b. John painted a picture in an hour. (ACC)
- (2.3) a. John walked for an hour.  
 b. \*John walked in an hour. (ACT)

The *for*-adverbial in (2.2a) is odd because the simple past implies the accomplishment is complete, but a *for*-adverbial simply indicates a period of time with no commitment to the completion of the event referred to. Activities do not have a specific point of completion, and the *for*-adverbial is therefore acceptable (2.3a).

The *in*-adverbial refers to a time leading up to the completion of an event, and is therefore felicitous with accomplishments (2.2b). If the *in*-adverbial has any interpretation with the activity expressions (eg, 2.3b), then the extent of the time described does not refer to the extent of the event, but to a period before that event: eg, *An hour later John went out for a walk*.

The same distinction can be drawn with the following sentences:

- (2.4) a. John spent an hour painting a picture.  
 b. It took John an hour to paint a picture. (ACC)

- (2.5) a. John spent an hour walking.  
 b. \*It took John an hour to walk. (ACT)

Activities and accomplishments can also be differentiated by the kinds of entailments that can be drawn about the time during which the event takes place. Both activities and accomplishments are durative events, but the quality of this duration differs.

- (2.6) a. For an activity sentence,  $\phi$ , if  $x$   $\phi$ -ed for  $y$  time then there is an entailment that at any time during  $y$ ,  $x$   $\phi$ -ed was true.  
 b. For an accomplishment sentence,  $\phi$ , if  $x$   $\phi$ -ed for  $y$  time then there is not an entailment that  $x$   $\phi$ -ed was true during any time within  $y$ .

This can be illustrated by the following examples:

- (2.7) a. John walked for an hour  
           → At any time during the hour, John walked  
 b. John built a house for three days  
       ↯ At any time within those three days, John built a house

Both activities and accomplishments can appear as the complement of *stop*, but only accomplishments can occur as the complement of *finish*:

- (2.8) a. John stopped painting the picture.  
 b. John stopped walking.  
 (2.9) a. John finished painting the picture.  
 b. \*John finished walking.

The adverb *almost* has different readings with activities and accomplishments.

- (2.10) a. John almost painted a picture.  
 b. John almost walked.

(2.10b) entails that John did not walk at all, but (2.10a) has two readings; one in which he did not paint the picture at all and one in which he began to paint the picture but never finished it.

When the internal structure of events is considered, and different types of bounds on events are distinguished, it will be possible to provide explanations for the distinctions between activities and accomplishments in terms of possible references to the internal structure of the events.

### 2.2.2.3 Achievements

Expressions of type achievement are acceptable with *in*-adverbials but not with *for*-adverbials.

- (2.11) a. John noticed the painting in a few minutes.  
 b. \*John noticed the painting for a few minutes. (ACH)

The time span of the *in*-adverbials with achievements is usually the period prior to occurrence of the event, whereas that for accomplishments is the time over which the event takes place. This corresponds to the durative/instantaneous distinction: since there is no durative span to the achievement, if the durative *in*-adverbial has an interpretation, it has to span a time before the event.

In the following set of examples, the first is acceptable, the second marginal.

- (2.12) a. It took John a few minutes to notice the painting.  
 b. ??John spent a few minutes noticing the painting.

Again, the time period referred to in (2.12a) corresponds to a period prior to the *noticing*-event, rather than the period of the event itself; this is because achievements are instantaneous events. (2.12b) is unacceptable because it implies that the *noticing*-event can be durative (with the time span *for a few minutes*).

This distinction between accomplishments and achievements is brought out again with the following entailment test:

- (2.13) a. If  $\phi$  is an accomplishment then  $x$   $\phi$ -ed in  $y$  time entails  $x$  was  $\phi$ -ing during  $y$  time.  
 b. If  $\phi$  is an achievement then  $x$   $\phi$ -ed in  $y$  time does not entail  $x$  was  $\phi$ -ing during  $y$  time.

For example,

- (2.14) a. John wrote a letter in two hours  
           → John was writing a letter during the two hours (ACC)  
 b. John noticed the painting in two hours  
       ↯ John was noticing the painting in those two hours (ACH)

Most achievements are not felicitous as complements of *start* or *finish*. For example,

- (2.15) a. ??John started noticing the painting.  
 b. \*John finished noticing the painting. (ACH)

With the tests to distinguish the above classes, it is possible to postulate the type of internal structure the events may have; for example, to distinguish between events which have duration (accomplishments and activities) and those which are instantaneous (achievements). Such internal structure is motivated in section 2.4.

### 2.2.2.4 Points vs achievements

Smith distinguishes semelfactives (or point expressions) from achievements (or culmination expressions). Moens also distinguishes these categories (and uses the terminology given in brackets here). Both expressions are perceived as instantaneous, and the distinctions between the two were described in section 2.2.1.1 where the main test for distinguishing the two is their acceptability with the perfect in English. The perfect is used as a test by Moens for whether an event has consequences associated with it: the perfect explicitly describes a state following the event which is called the consequent state. Point expressions like *sneeze* and *cough* are usually not felicitous with the perfect. Certain contexts are excepted; those in which consequences may be evoked by world knowledge): ??*John had sneezed* or ??*John had coughed* sound less acceptable than culmination expressions in the perfect, eg *John had arrived*, *John had noticed the picture on the wall*.

## 2.2.3 The Russian tradition: aspectual classes of Russian sentences

Having given tests for aspectual classes for English expressions, in this section I use similar tests to motivate a set for Russian. These tests are basically the same, and Vendler's set of aspectual classes can be identified for Russian. Additionally, an extra aspectual class is identified (conatives), and this extra category can be represented within the underlying ontology proposed in the form of event templates (section 2.4). This classification of Russian verbs is compared with a classification proposed by Maslov (1948), reviewed in Forsyth (1970), and I discuss the relationship between the two.

In this section I shall show how Vendler's aspectual classification can be used to identify the same verb and sentence types as have been identified for English, and motivate this with tests like Dowty's applied to the Russian counterpart sentences. By establishing the same aspectual class classification, I can apply the same event templates (introduced in section 2.4) to Russian sentences to reflect the internal structure of the event referred to. This allows a comparison of event reference between the two languages, and is similar to Smith's temporal schemata (discussed in the next section). The event templates will be employed in subsequent chapters to account for a variety of aspectual phenomena in both English and Russian. Although the syntactic and morphological structure of these aspectual phenomena vary between English and Russian, the basic representation of aspectual class for the two languages is the same, giving a basis for comparing aspectual phenomena in the two languages.

Having motivated Vendler's classification with Russian data<sup>2</sup>, I go on to compare this approach with two classifications of verbs in the Russian literature; one is a traditional categorisation according to pairs of verbs in the perfective and imperfective

aspect (verb pairing) and the other is according to various lexical meanings which certain perfective forms acquire ('procedural' forms, a term used by Forsyth 1970).

The event templates reflect the internal structure of event expressions and provide the framework to show how different phases of an event are related to others. This allows the relationship between perfective and imperfective aspect and the procedural forms to be shown clearly. In fact, if each of these categorisations is treated as an aspectual category, and aspect is considered as focusing on various parts of the event template, a unified account can be given for all these aspectual phenomena. This reflects the general aim of this thesis.

In the following sections, the ground work is carried out to show how event templates can be applied to the Russian data. In section 2.2.3.1, the perfective/imperfective aspectual distinction in Russian is discussed, followed in section 2.2.3.2 by the application of Dowty's tests to Russian examples. The categorisation resulting from this is compared with Forsyth's categories in section 2.2.3.3 (Forsyth 1970, after Maslov 1948). In section 2.2.3.4, various procedural meanings of Russian are introduced.

### 2.2.3.1 The imperfective/perfective distinction in Russian

Russian expresses aspect in its verb morphology. A distinction is made between perfective and imperfective aspect by prefixation or suffixation, and a pair of verbs can usually be identified which do not differ in their lexical meaning, but only by aspect which typically conveys the difference (amongst others) between a completed action (perfective) and an ongoing action or an iterated action (imperfective). Many verbs have a variety of possible perfective forms, and from these a secondary imperfective can often be formed. These perfectives can add an additional meaning to the verb, referring to a totally different event, or explicitly describing a different part of the event template (eg inceptives or terminatives); Forsyth (1970) terms these 'procedural' forms. One of the main motivations for event templates as they are presented in the thesis is to show the relationship between these different forms of perfectives for Russian, and to highlight parallels in English where the same distinctions are often made with different lexical items, such as the use of aspectual verbs.

The distinction between perfective and imperfective forms can be illustrated by inferences similar to those suggested by Dowty for the simple and progressive aspects in English. If sentences in the imperfective aspect explicitly describe an event in progress (ongoing action, or imperfective aspect), then it is predicted that this will not entail a sentence describing the completed event (perfective aspect). This holds for many imperfective/perfective pairs in Russian (a pair is usually defined as consisting of two verb which are synonymous apart from aspect), and corresponds loosely to the progressive/simple aspect distinction in English. Note, however, that the perfective aspect in Russian can correspond either to the simple aspect or perfect aspect in English, depending on the context. This correspondence will become apparent in the analysis of viewpoint aspect in Chapter 3.

- (2.16) Vadim stroil dom  $\nrightarrow$  Vadim postroil dom.  
Vadim built(IMP) house Vadim built(PERF) house

<sup>2</sup>Thanks to Ivan Derzhanski, Natasha McGrath and Tanya Herries for help with the intuitions.

'Vadim was building the house  $\nrightarrow$  Vadim built the house.'  
 where the former is in the imperfective aspect (IMP), and the latter is in  
 the perfective aspect (PERF).

This can be expressed slightly differently:

- (2.17) On stroil dom, no ne postroil ego.  
 he built(IMP) house but not built(PERF) it  
 'He was building the house, but didn't complete it.'

Similar tests were given in section 2.2.2 for English. Smith also uses similar tests  
 both for English and Russian (Smith 1991: 310).

In section 2.2.3.2, I shall apply Dowty's tests to Russian counterparts to identify  
 Vendler's set of aspectual classes for Russian. Forsyth (1970) categorises according  
 to aspectual pairs and 'procedural nuance' which he describes by the German term  
 Aktionsart. He does not classify Russian verbs in terms of Vendlerian aspectual  
 class. This classification is discussed in section 2.2.3.3 and compared with Vendler's  
 classes.

### 2.2.3.2 Russian data, Vendler's aspectual classes and event templates

Smith (1991) assumes a Vendlerian categorisation for Russian sentences. She gives  
 Russian examples to illustrate the categorisation, but does not motivate the cate-  
 gories with contrasting examples. In this section, I shall use Dowty's tests of temporal  
 adverbials (eg, the Russian equivalent of *in-*, *for-* and *at-*adverbials: *za-*, bare noun  
 phrase, and *v-*adverbials respectively) to motivate the aspectual classes; for example,  
*in-*adverbials are fine with culminated process expressions but not with process ex-  
 pressions, and in Russian the same holds for *za-*adverbials. I use Moens' terminology  
 since this relates more intuitively to the structure of the event templates, which are  
 also employed for Russian.

Hoepelman (1981) devotes his work to Russian verb classification and works  
 within Vendler's framework. However, he relies on English data to motivate the verb  
 classes. While using Dowty's tests for English, he does not apply them to Russian  
 examples, assuming the categories carry across from the English. He suggests that  
 Vendler's aspectual classes exist in Russian because "the structure of events [is]  
 independent of any particular language" (Hoepelman 1981: 5). With this universalist  
 hypothesis he "often takes data from English which is as good as any other language  
 if we deal with verb classes which we assume to be universally present" (Hoepelman  
 1981: 5). In this section I shall give Russian examples to demonstrate that this holds,  
 at least for English and Russian.

Hoepelman refers to what Forsyth terms procedural verbs as Aktionsarten, con-  
 fusing them with Vendler's classes, but noting that some of Vendler's classes "refer  
 to different parts of the event" requiring an analysis "which identifies the beginning  
 of the action" (Hoepelman 1981: 119). The proposed event templates provide the  
 ontology which allow these different parts to be referred to, ie the I-BOUND-phase

identifies the beginning of an event, which can be described by certain prefixes, eg  
*zagovarit'* ('to start speaking') is contrasted with *govarit'* ('to speak') and *pogovarit'*  
 ('to speak for a while').

Cochrane (1977) identifies Vendler's categories for Serbo-Croatian and refers to  
 completed and ongoing actions. She also discusses the relationship between Forsyth's  
 and Vendler's classifications. Her results for Serbo-Croatian are compatible with  
 the presentation made here. Cochrane does not, however, give explicit details of  
 the internal structure of events. The introduction of event templates related to  
 aspectual class is intended to provide this more detailed analysis and, in the process,  
 demonstrate the relationship between different phases of events.

Paducheva (1990) offers diagrams to reflect Vendler's aspectual classes for Rus-  
 sian, and these show the internal structure of the events referred to; the components  
 are very similar to Smith's schemata, and the event phases that I introduce. For  
 example,  $t_i$  and  $t_j$  correspond to the initial endpoint and natural final endpoint re-  
 spectively; achievements (ie culminations) are represented by  $t_i$  and  $t_j$  which are  
 cotermporal.

Turning to Dowty's tests in the context of Russian data, contrasting sentence  
 types can be identified by noting the patterning of perfective and imperfective verbs  
 forms with certain temporal adverbials. The perfective aspect is traditionally re-  
 garded as referring to completed events, and it is therefore predicted that it will  
 co-occur with *za-*phrases (corresponding to English *in-*phrases) which determine the  
 temporal duration of an event to its completion, but that it will be anomalous with  
 a bare temporal noun phrase (English *for-*phrase) which does not explicitly describe  
 the completion of an event. *V-*phrases (English *At-*phrases) typically refer to an  
 instantaneous event, explicitly describing the occurrence time.

The imperfective aspect refers to incomplete events, and may therefore be com-  
 pared with the progressive aspect in English. Its patterning with *for-*phrases, but  
 not *in-*phrases, reflecting the correspondence of the Russian imperfective with the  
 English progressive. The Russian imperfective is also used to refer to iterated events.  
 If a single event reading is not available with the imperfective (for example, with cul-  
 mination expressions), then the sentence is often interpreted (where context allows)  
 as describing a series of events of the type referred to. In the following examples, the  
 Russian is given followed by a word-by-word gloss with the morphological aspect of  
 the verb indicated by IMP or PERF; a translation follows the gloss using a tense in  
 English which best conveys the sense of the example.

### Culminated process expressions

Data for sentences with *pisat'*/*napisat'* ('to write') reveal a patterning similar to that  
 for the English *to write*, suggesting that sentences with *pisat'*/*napisat'* are culminated  
 process expressions.

- (2.18) a. Vadim za 10 minut napisal pis'mo.  
 Vadim in 10 minutes wrote(PERF) letter

'Vadim wrote the letter in 10 minutes.'

- b. \* Vadim za 10 minut pisal pis'mo.  
 Vadim in 10 minutes wrote(IMP) letter  
 \* 'Vadim was writing the letter in 10 minutes.'  
 but an iterative reading is okay:  
 '(Every day) Vadim wrote a letter in 10 minutes.'

The perfective is acceptable with *za 10 minut*: the completion of a durative event is explicitly described by the adverbial which includes a culmination phase. This contrasts with the imperfective equivalent, which does not explicitly describe the completion of the *letter-writing*-event since this conflicts with the completion required by the adverbial (and can be further tested with examples like 2.16 above). These examples contrast with process expressions which do not allow the co-occurrence of the perfective aspect with *za*-adverbials (2.24) since the event does not end with a culmination phase.

- (2.19) a. \* Vadim 10 minut napisal pis'mo.  
 Vadim 10 minutes wrote(PERF) letter  
 \* 'Vadim wrote the letter for 10 minutes.'  
 b. Vadim 10 minut pisal pis'mo.  
 Vadim 10 minutes wrote(IMP) letter  
 'Vadim was writing the letter for 10 minutes.'

A bare temporal noun phrase in Russian is equivalent to an English *for*-adverbial, and does not combine with culminated process expressions in the perfective (compare, however, process expressions, exemplified in 2.25a). It is fine with the imperfective which does not explicitly describe the culmination point.

- (2.20) a. ?? V 2 chasa Vadim napisal pis'mo.  
 at 2 hour Vadim wrote(PERF) letter  
 'At 2 o'clock Vadim wrote the letter.'  
 'At 2 o'clock Vadim had written the letter.'  
 b. V 2 chasa Vadim pisal pis'mo.  
 at 2 hour Vadim wrote(IMP) letter  
 'At 2 o'clock Vadim was writing the letter.'  
 (ie in process of writing)

*V 2 chasa* ('At 2 o'clock'), like the English punctual adverbial, refers to a specific point in time. With the imperfective aspect it picks out an arbitrary point during the process of the event behaving in the same way as the English progressive (*V 2 chasa Vadim pisal pis'mo* 'Vadim was writing the letter at 2 o'clock' [and he started it sometime before then and continued writing it after 2pm]).

In the perfective, it is acceptable with instantaneous events (like culminations), but with durative events (like the culminated process expression here) the interpretation relies on some extra processing to try to fit the event into or around a point

in time. (2.20a) is anomalous but can have an interpretation if the letter is short: replacing *pis'mo* ('letter') with *zapisku* ('note') results in a more acceptable sentence, but replacing it with *dissertatsiu* ('thesis') is unacceptable. This implies that it is not the beginning of the event which the *v*-adverbial explicitly describes, but that the event is somehow telescoped into this time, although by pragmatic knowledge the language user knows that the event took place around this time.<sup>3</sup>

In Russian the perfective aspect has a second reading where the state following the completed event is explicitly described (the consequent state in the event templates). The perfective always refers to an event which is completed, but it is not always the completed event itself which is explicitly described; the consequent state can also be the 'focus' of the aspect's meaning. Therefore, *v 2 chasa* can refer to a point in time during the consequent state; hence the translation 'At 2 o'clock Vadim had written the letter.' This reading is often determined by context, and *uzhe* ('already') forces the reading, but is not obligatory if the context is sufficient. Examples are given in (2.21)–(2.23), the latter two from Rassudova 1984: 28.

- (2.21) V 2 chasa Vadim uzhe napisal pis'mo.  
 at 2 o'clock Vadim already wrote(PERF) letter  
 'At 2 o'clock Vadim had already written the letter.'  
 (2.22) Zriteli uselis na svoi mesta.  
 spectators sat-down(PERF) on their seats  
 'The spectators had taken their seats/took their seats.'  
 (2.23) Zasedanie uchenogo soveta nachalos'  
 meeting of-academic council started(PERF)  
 'The meeting of the academic council had started/started.'

### Process expressions

- (2.24) a. \* Vadim pogulyal za 10 minut po parku.  
 Vadim walked(PERF) in 10 minutes in park  
 \* 'Vadim walked in 10 minutes in the park.'  
 b. \*\* Vadim gulyal za 10 minut po parku.  
 Vadim walked(IMP) in 10 minutes in park  
 \* 'Vadim was walking in 10 minutes in the park.'

(2.24a) could have an interpretation if there is some sort of fixed route taken around the park, and this is completed. Compare the English process *work in the garden*, which can be considered to have a culmination in certain contexts allowing

<sup>3</sup>In terms of Moens' aspectual network and coercion (which will be discussed in Chapter 3), to get an interpretation with culminated processes and *v*-adverbials, there has to be a valid path from culminated processes to culminations.

the sentence *John finished working in the garden* when John completes what he set himself to do that day. But in these cases, the sentences can be considered as culminated processes.<sup>4</sup>

Processes and culminated processes can be distinguished by *za*-adverbials: for culminated process expressions, (2.18a) is okay, and (2.18b) is not, whereas for process expressions neither (2.24a) nor (2.24b) are okay.

- (2.25) a. Vadim pogulyal 10 minut po parku.  
Vadim walked(PERF) 10 minutes in park  
'Vadim walked for 10 minutes in the park.'
- b. Vadim gulyal 10 minut po parku.  
Vadim walked(IMP) 10 minutes in park  
'Vadim was walking for 10 minutes in the park.'

Both (2.25a) and (2.25b) are acceptable in Russian. The perfective prefix *po-*delimits the extent of the event referred to, but there is no implied culmination, reflected in the acceptability of the noun phrase *10 minut* (equivalent to English 'for 10 minutes'). These examples again distinguish process and culminated process expressions.

- (2.26) a. V 2 chasa Vadim pogulyal po parku.  
at 2 hour Vadim walked(PERF) in park  
'At 2 o'clock Vadim walked in the park.'  
'At 2 o'clock Vadim had walked in the park.'
- b. V 2 chasa Vadim gulyal po parku.  
at 2 hour Vadim walked(IMP) in park  
'At 2 o'clock Vadim was walking in the park.'  
(ie was in the process of walking at 2 o'clock)

As for culminated processes, *v 2 chasa* with the perfective has two readings. The first reading is most likely to be interpreted as an inceptive.

### Culminations

Distinction between single events and iterated events is important with culminations. Culminations are perceived as being instantaneous events, and there is therefore no durative phase for the imperfective to refer to. The imperfective aspect always has an iterative interpretation. However, in certain cases if the context allows, an extended event reading is possible for culminations in the imperfective. This is discussed in Chapter 4. In English, it is perhaps easier to have this reading since there is not a tension between that reading and an iterative interpretation, unlike in Russian where the propensity for an iterative reading often outweighs the potential for a

<sup>4</sup>Some extra processing is necessary to derive a culminated process expression from the process one; such processing is discussed in Chapter 3.

single event interpretation (but see example 2.30 below). There is the same tension for culminated process and process expressions, but the single event interpretation is pragmatically more likely for these expressions, since they are durative and the imperfective describes the **PROC**-phase of the event.

- (2.27) a. Vadim za 10 minut nashel knigu.  
Vadim in 10 minutes found(PERF) book  
'Vadim found the book in 10 minutes.'  
(period prior to the *finding*-event)
- b. ITERATIVE: Vadim za 10 minut nahodil knigu.  
Vadim in 10 minutes found(IMP) book  
'(Every day) Vadim found the book in 10 minutes.'  
(only iterative reading available with imperfective)

Example (2.27) distinguishes *nahodit'*/*najti* ('to find') from culminated process and process expressions: the time period described by *za 10 minut* ('in 10 minutes') always refers to the time prior to the occurrence of the *finding*-event. In (2.27b), the imperfective cannot refer to the single event, since there is no durative phase to describe.

- (2.28) a. \*Vadim 10 minut nashel knigu.  
Vadim 10 minutes found(PERF) book  
\* 'Vadim found the book for 10 minutes.'
- b. \*Vadim 10 minut nahodil knigu.  
Vadim 10 minutes found(IMP) book  
\* 'Vadim was finding the book for 10 minutes.'

Both (2.28a) and (2.28b) are out, also differentiating culmination expressions from process and culminated process expressions.

- (2.29) a. V 2 chasa Vadim nashel knigu/5 knigi.  
at 2 hour Vadim found(PERF) book/5 books  
'Vadim found the book at 2 o'clock.'  
'Vadim found 5 books at 2 o'clock.'  
(a set of books; a single *finding*-event)
- b. ITERATIVE: V 2 chasa Vadim nahodil knigu.  
at 2 hour Vadim found(IMP) book  
'(Each day) at 2 o'clock, Vadim found the book.'  
(only iterative reading, which sounds odd)

The perfective is fine with *v 2 chasa*, but the imperfective sounds odd unless there is an adverbial explicitly indicating the iterative reading.

## Culminations and backgrounding

As was noted above, in some contexts the imperfective can be used with culminations to refer to a single event. This is in contexts where the culmination is to be viewed as an event with duration; because the iterative reading is strongly preferred for culmination expressions in the imperfective, a syntactic marker (like *po doroge* 'on the way') is often preferred to confirm the unusual use of the imperfective.

- (2.30) Ona vhdila        na    stseni i    (po doroge) otdala tsvety ne tomu  
 she go-onto(IMP) onto stage and (on way) gave flowers not that-DAT  
 cheloveku.  
 person-DAT  
 'As she went up onto the stage, she gave the flowers to the wrong person.'

## 'Culminations with related processes'/Conatives

In Russian there is a group of verbs called conatives by Forsyth (1970). They behave like Russian culminated process expressions by patterning with temporal adverbials in the same way. However, the perfective does not explicitly describe the whole of the durative event, but just the CULMIN-phase (ie, the final part of the template). For example, *ubezhdai'/'ubedit'* corresponds to the English 'try to convince someone/to convince them'. There is an inferred relationship between *trying to do something* and *achieving this*, where *try* is a process expression and *achieving doing it* is a culmination expression. The template for both includes a CULMIN-phase and there is an inference that these two CULMIN-phases refer to the same event in the real world: the culmination of trying to do something is actually achieving it; not achieving it falls short of the CULMIN-phase and one can *stop trying* before that. Inferencing between different kinds of events is discussed with more examples in section 4.4 of Chapter 4. The Russian category of conatives indicates a relationship where the imperfective aspect explicitly describes a durative event of attempting to do something, eg trying to convince someone of something. The perfective counterpart explicitly describes a CULMIN-phase indicating the successful completion of this attempt, eg actually convincing or persuading someone to do something. Forsyth notes that the process related to the CULMIN-phase is "an attempt to perform the action which the perfective denotes" (Forsyth 1970: 49). The event template therefore looks like the one for culminated processes, but different aspectual and temporal adverbials are used to explicitly describe different phases. By the way the components of the event templates are interlinked (as discussed in section 2.4), the relationship between the aspect of the verb and the reference to the event phase can be made without changing the underlying ontology. While for other aspectual classes a prefix is required to explicitly describe a particular phase of the template, for conatives the perfective aspect is sufficient to explicitly describe the CULMIN-phase following a PROC-phase.

- (2.31) a. Masha za 10 minut ubedila        Vadima.  
 Masha in 10 minutes convinced(PERF) Vadim

'Masha convinced Vadim in 10 minutes.'

- b. ITERATIVE: Masha za 10 minut ubezhdala        Vadima.  
 Masha in 10 minutes convinced(IMP) Vadim  
 '(Every day) Masha convinced Vadim in 10 minutes.'  
 (iterative reading only)

- (2.32) a. \* Masha 10 minut ubedila        Vadima.  
 Masha 10 minutes convinced(PERF) Vadim  
 \* 'Masha convinced Vadim for 10 minutes.'
- b. Masha 10 minut ubezhdala        Vadima.  
 Masha 10 minutes convinced(IMP) Vadim  
 'Masha was convincing/was trying to convince Vadim for 10 minutes'  
 (and most likely didn't succeed in convincing him)
- (2.33) a. V 2 chasa Masha ubedila        Vadima.  
 at 2 hour Masha convinced(PERF) Vadim  
 'At 2 o'clock Masha convinced Vadim.'
- b. V 2 chasa Masha ubezhhdala        Vadima.  
 at 2 hour Masha convinced(IMP) Vadim  
 'At 2 o'clock Masha was convincing/was trying to convince Vadim'  
 (in process of)  
 'At 2 o'clock (each day) Masha was trying to convince Vadim.'

*V 2 chasa* ('at 2 o'clock') is acceptable on the single event reading for both (2.33a) and (2.33b). In (2.33a) it clearly refers to the culmination (or termination of the process of trying to convince), and for (2.33b) it refers to the time when Masha was in the process of trying to convince Vadim. For other durative events, *v 2 chasa* with the perfective usually sounds slightly odd.

## Statives

Stative verbs generally have no obvious perfective counterparts; however there are a number of related perfective forms which 'focus' on a particular part of the state being referred to. For example *lyubit'* ('to love') has a perfective counterpart *polyubit'* ('to fall in love') which indicates the start of a state of loving (the inchoative reading). *Vlyubit'sya* ('to fall in love') is a perfective related to *lyubit'* which also indicates this bound. These are referred to by Forsyth (1970) as procedural meanings and are a kind of aspectual operator in that they focus different parts of the event template.

- (2.34) \* Vadim lyubil        Mashu za 3 goda.  
 Vadim loved(IMP) Masha in 3 years  
 \* 'Vadim loved Masha in 3 years.'

- (2.35) Vadim lyubil Mashu 3 goda.  
Vadim loved(IMP) Masha 3 years  
'Vadim loved Masha for 3 years.'
- (2.36) ? Vadim lyubil Mashu v 2 chasa.  
Vadim loved(IMP) Masha at 2 hour  
? 'Vadim loved Masha at 2 o'clock.'  
(Vadim was in a state of loving Masha at 2 o'clock and loved her before  
and after that time.)

### Tests with aspectual verbs

Aspectual verbs can be used as tests for aspectual class in a similar way to English. For culminated process expressions, each of *start*, *stop* and *finish* are acceptable, as the examples in 2.37 show.

- (2.37) a. Vadim nachal pisat' pis'mo.  
Vadim started(PERF) to-write(IMP) letter  
'Vadim started to write the letter.'
- b. Vadim perestal pisat' pis'mo.  
Vadim stopped(PERF) to-write(IMP) letter  
'Vadim stopped writing the letter.'
- c. Vadim konchil pisat' pis'mo.  
Vadim finished(PERF) to-write(IMP) letter  
'Vadim finished writing the letter.'

Process expressions are not felicitous with *finish* since this explicitly describes the culmination phase, which is not a value of the event template for process expressions.

- (2.38) a. Vadim nachal igrat' v sadu.  
Vadim started(PERF) to-play in garden  
'Vadim started to play in the garden.'
- b. Vadim perestal igrat' v sadu.  
Vadim stopped(PERF) to-play in garden  
'Vadim stopped playing in the garden.'
- c. \* Vadim konchil igrat' v sadu.  
Vadim finished(PERF) to-play in garden  
\* 'Vadim finished playing in the garden.'

Culmination expressions are perceived as being instantaneous, so in most contexts the constituent parts of the event can not be explicitly described.

- (2.39) a. \* Vadim nachal nahodit' knigu.  
Vadim started(PERF) to-find book  
\* 'Vadim started finding the book.'
- b. \* Vadim perestal nahodit' knigu.  
Vadim stopped(PERF) to-find book  
\* 'Vadim stopped finding the book.'
- c. \* Vadim konchil nahodit' knigu.  
Vadim finished(PERF) to-find book  
\* 'Vadim finished finding the book.'

Conatives behave like culminated process expressions, except that in example (2.40c) the perfective would better describe the completion of the event.

- (2.40) a. Vadim nachal ubezhdat' ego.  
Vadim started(PERF) to-convince him  
'Vadim started convincing him.'
- b. Vadim perestal ubezhdat' ego.  
Vadim stopped(PERF) to-convince him  
'Vadim stopped convincing him.'
- c. ? Vadim konchil ubezhdat' ego.  
Vadim finished(PERF) to-convince him  
? 'Vadim finished convincing him.'

### Summary of data

For ease of reference, I present a table here showing the acceptability or infelicity of expressions in the perfective or imperfective aspects for single event readings with various temporal adverbials, and with certain aspectual verbs.

	<i>za 10 minut</i> 'in 10 minutes'		<i>10 minut</i> 'for 10 minutes'		<i>v 2 chasa</i> 'in 2 hours'	
	PERFV	IMPV	PERFV	IMPV	PERFV	IMPV
Cul'd Process	ok	* (or iter)	*	ok	?*	ok
Process	*	*	ok	ok	(incep)	ok
Culmination	(prior)	* (or iter)	*	*	ok	* (or iter)
Conative	ok	* (or iter)	*	ok	ok	ok
Semelfactive	*	*	*	ok	ok	ok
Stative	—	*	—	ok	—	??



	<i>nachat'</i> 'start'	<i>perestat'</i> 'stop'	<i>konchit'</i> 'finish'
Cul'd Process	ok	ok	ok
Process	ok	ok	*
Culmination	*	?*	ok
Conative	ok	ok	??
Semelfactive	ok	ok	?
Stative	*	ok	*

### 2.2.3.3 Forsyth's 'aspectual-semantic' groups compared with Vendler's

In this section I discuss Forsyth's grouping of verbs according to their pairing as perfective/imperfective counterparts, and relate the groups to the aspectual classes proposed in the previous section. Cochrane (1977) provides a similar comparison for Serbo-Croatian between Vendler's and Forsyth's grouping.

In Chapter 2 of Forsyth (1970), five 'aspectual-semantic' classes are set up, based on an earlier classification by Maslov (1948). The classes are set up according to whether or not a particular verbs has an imperfective/perfective aspectual pair. Paducheva 1990: 8 criticises this approach since the criteria for classification is dependent on the interpretation of aspect<sup>5</sup>, rather than being independently motivated. This contrasts with the independent motivation of Vendler's classification in terms of the linguistic data presented in the previous section, dependent on

The groups consist of unpaired verbs (Group 1 of unpaired perfectives and Group 5 of unpaired imperfectives), and paired verbs (Groups 2–4). The criteria for a pair of verbs is based on the requirement that "the two members of a pair should be identical in meaning in all respects except aspect" (Forsyth 1970: 35). This can be tested by transposing a text with a series of sentences containing perfective past tense verbs into the imperfective present (the historic mode of narration). If no new lexical items are required to convey the same unfolding of events, then the verbs are considered to constitute a valid aspectual pair. Forsyth exemplifies (Forsyth 1970: 35):

- (2.41) On vstal, poshel k oknu i otkryl ego.  
He got-up, went to window and opened it  
(PERF,PST) (PERF,PST) (PERF,PST)

transposes as:

- (2.42) On vstaet, idet k oknu i otkryvaet ego.  
he gets-up, goes to window and opens it  
(IMP,PRES) (IMP,PRES) (IMP,PRES)

showing that the following are valid aspectual pairs: *vstavat'/vstat'*, *idti/pojti* and *otkryvat'/otkryt'*.

<sup>5</sup>In terms of the perfective and imperfective aspectual distinction, discussed in detail in Chapter 3.

A second criteria for pairing verbs is the lack of a secondary imperfective to a perfective form.

There are often a number of possible perfective forms for any given imperfective, and those not constituting the perfective counterpart for the imperfective usually carry an additional meaning (and a secondary imperfective can often also be derived). The meaning of these procedural forms will be discussed in section 2.2.3.4.

### Groups 1 and 2

Group 1 (unpaired perfectives) consists of a group of verbs which lack an imperfective form. They refer to "the instant of performance and the 'leap' into a new state" (Forsyth: 47). For example:

- vozenavidet' to conceive hatred  
polyubit' to get to like/to fall in love  
zaplakat' to start crying

These examples are inceptives (explicitly describing the start of a related event or state), and are also called 'procedurals' (see section 2.2.3.4). Their patterning is like culminations, which would be expected if there is no imperfective counterpart: there is no process phase for the imperfective to refer to. Taking *zaplakat'* ('to start crying') as an example, the patterning, which corresponds to the patterning for culminations in section 2.2.3.2, is as follows:

- (2.43) Alesha zaplakal za 10 minut.  
Alesha started-cry(PERF) in 10 minutes.  
'Alesha started to cry in 10 minutes.'  
(time period prior to the *starting*-event)
- (2.44) \* Alesha 10 minut zaplakal.  
Alesha 10 minutes started-cry(PERF)  
\* 'Alesha started to cry for 10 minutes'
- (2.45) Alesha zaplakal tochno v 2 chasa.  
Alesha started-cry(PERF) exactly at 2 o'clock

Group 2 verbs are similar to Group 1 but are paired with an imperfective: they refer to a change to a new state, and a process leading to that change is not part of the meaning. Forsyth points out that, unlike imperfectives referring to an event with duration, adverbials like *dolgo* ('for a long time') and *medlenno* ('slowly') do not combine with verbs of this group. The imperfective counterpart for Group 2 verbs only has an iterative interpretation in the past tense (or historical/narrative interpretation in the present). By the tests for aspectual class, sentences with Group 2 verbs also pattern as culmination expressions; *nahodit'/najti* ('to find') is a Group 2 verb and was used to exemplify culmination expressions in section 2.2.3.2.

## Groups 3 and 4

Forsyth notes that, for these two groups, the imperfective can be used to explicitly describe single events, and presents “the action as a continuous unfolding process” (Forsyth 1970: 49). However, the perfective aspect for Group 3 verbs seems to refer just to the “transition or ‘leap’ into a new state” (Forsyth 1970: 49). For Group 4 verbs, the perfective explicitly describes the whole of the extended event, including the process phase and culmination phase.

The relevant distinction here seems to be that between conative expressions (Group 3) and culminated process expressions (Group 4), as discussed in section 2.2.3.2.

Conative expressions in Group 3 highlight a distinction between an attempt to reach a culmination (expressed by the imperfective aspect), and the reaching of that goal (expressed by the perfective; the *v*-phrase (‘at’) explicitly describes the culmination phase). Some of the examples given by Forsyth are:

lovit'/pojmat' rybu	to try to catch/catch fish
sdavat'/sdat' ekzamen	to sit/pass an exam
ubezhdat'/ubedit'	to try to convince/convince

However, not all verbs in Group 3 behave like conatives. Some, although they admit an imperfective on the single event reading, do not seem to convey a sense of there being a phase of attempting to carry out the action, because the event is perceived as instantaneous. For example:

davat'/dat'	to give
konchat'/konchit'	to finish
nachinat'/nachat'	to start
padat'/upast'	to fall
perestavat'/perestat'	to stop
posylat'/poslat'	to send
postupat'/postupit'	to enter
prosypat'sya/prosnut'sya	to wake up

If the imperfective is used, it seems to telescope in on the instantaneous event which is usually described by the perfective aspect. These expressions belong to the class of culminations. The imperfective serves the function of dramatising the event, and it is difficult to state that the event did not occur even when the imperfective is used, as is shown in example (2.46). With conatives, however, it is possible to state that the *convincing*-event was not successful (2.47). Group 3 verbs, therefore, subdivide as conatives and culminations. A detailed account of culminations which ‘telescope in’ on the instantaneous event is given in Chapter 4.

- (2.46) \* On daval podarok, no ne dal ego.  
 he gave(IMP) present, but not give(PERF) it  
 \* ‘He was giving the present but didn’t give it.’  
 (Modified from Cochrane 1977: 113)

- (2.47) Masha ubezhdala Vadima, a ne ubedila ego.  
 Masha convince(IMP) Vadim, but not convinced(PERF) him

‘Masha tried to convince Vadim, but didn’t manage to.’

## Group 5: unpaired imperfectives

Process and state expressions often do not have a perfective counterpart. Any perfective derived from the imperfective does not fulfill the criteria to be one of a pair and those perfectives explicitly describe a particular event phase. Examples were given in Group 1 where the perfective indicates that a state is bounded and marking, say, a change of state not obtaining to it obtaining. For example, *polyubil Vadima* (‘to started loving Vadim’) explicitly describes an I-BOUND-phase marking the beginning of a state of loving Vadim.

## Conclusions

In this section I have showed how Forsyth’s ‘aspectual-semantic’ grouping corresponds to the Vendler-style aspectual classification which I motivated for Russian. However, there is some overlap of classes in each of the groups, because Forsyth is categorising more by intuitive feel (‘the inherent meaning is the complete event’/‘the transition described by the perfective’) than by the tests with temporal adverbials which I have used. However, although it is not so fine-grained as the event templates, Forsyth’s intuitive categorisation is in line with their details; eg the ‘leap into a new state’ is characterised by the culmination phase in the templates.

### 2.2.3.4 Classification of Russian verbs by their procedural meanings

The second classification that Forsyth introduces highlights the ‘procedural’ meanings of perfective verbs, which are often termed Aktionsarten and are confused with Vendler’s aspectual classes in some work. Forsyth notes that most of these verbs fall into Group 1 of the ‘aspectual-semantic’ grouping. They are formed by the addition of a perfectivising prefix to the imperfective counterpart, but this prefix alters the meaning of the verb. They fall into Group 1 because they have no imperfective partner with the same meaning.

Rather than deal with these verbs as a separate class, I show in this section how they explicitly describe different parts of the event template (usually bounds, eg the I-BOUND-phase for inceptives; or describe the duration of an event with a particular nuance, eg *po-* indicating in some contexts that a durative event extends over a relatively short time period, or marking the inception of an event in other contexts), and can thus be dealt with in a unified analysis which has event templates as the underlying ontology.

Forsyth identifies the following ‘procedural’ meanings:

- inceptives: marking the beginning of an event  
 eg, *zaplakat'* (‘to start crying’), explicitly describing the I-BOUND-phase of an event template
- absorptives: indicating that the agent is absorbed in the action

- terminatives: marking the end of an event  
eg, *dopisat'* ('to finish a letter'), explicitly describing the CULMIN-phase of an event template
- completion: termed resultative, indicating the achievement of a desired result
- attenuatives: indicating that a durative event takes place for a short period only  
eg, *popisat'* ('to write a letter for a short time'), where the temporal extent of the event template's PROC-phase is indicated as being relatively short.
- totalising events: indicating that an event is performed to its "total degree"

Although the perfective aspect describes a completed event, some of the procedural verbs explicitly describe only part of the event template. However, I have shown that some events referring to the initial bound phase or culmination phase of a template can be classed as culmination expressions; the perfective aspect thus explicitly describes the completion of that culmination expression. The culmination expression (describing, say, the initial bound phase) is then related to other phases of a larger template (including the initial bound, with, in addition a process and final bound phase) which represents the main event referred to.

For example, (2.48a) is a process expression with a corresponding perfective which is an inceptive (2.48b). The process expression is associated with an event template consisting of the following phases: initial bound, process, and final bound.

- (2.48) a. Vadim govovil 5 minut.  
Vadim talked(IMP) 5 minutes  
'Vadim talked/was talking for 5 minutes.'
- b. Vdrug Vadim zagovovil.  
suddenly Vadim started-talk(PERF)  
'Suddenly Vadim started to talk.'
- c. Vadim pogovovil 5 minut.  
Vadim talk(PERF) 5 minutes  
'Vadim talked for 5 minutes.'

The *po-* prefix in (2.48c) perfectivises the verb and indicates that the event took a relatively short length of time; the adverbial indicates that this period was 5 minutes. The sentence patterns like a process expression, and in this example the whole of the process event template is described.

For the examples in (2.48), one event template (relating to the process of *talking*) is evoked in the processing of each of the examples. Each example explicitly describes the same event from a slightly different perspective (ie, explicitly describes certain parts of the event template), and the event templates illustrate the relationship between these perspectives.

An analysis of viewpoint aspect is developed in Chapter 3, which indicates how part of the event template which is explicitly described is identified within a feature

structure framework. An analysis of procedural forms is given in Chapter 5, and the results are compared with the analysis of aspectual verbs. For example, a full analysis of *zaplakat'* ('to start crying') is given in section 5.5.2.2, and of *dopisat'* ('to complete a letter') in section 5.5.4.2.

### 2.2.3.5 Conclusions

In this section, I have shown that Russian verbs can be classified in the spirit of Vendler's categories. Event templates reflect the internal structure of events referred to in Russian. Traditional categories can be cast in terms of aspectual class and the event templates presented in section 2.4, showing more clearly the relationship between different aspectual forms in Russian.

This forms the ground work for comparing event reference in English and Russian. I have motivated the foundations for event templates in both languages, and in the coming chapters will demonstrate how they can be taken as the basis for representing event structure in a feature structure formalism, which is developed to provide a unified account of various aspectual phenomena, such as viewpoint aspect and aspectual verbs.

The fact that the event templates are applicable to the Russian aspectual classes as well as English provides further evidence that the constituent phases reflect some sort of conceptual structure of events which language users employ when interpreting natural language. Smith provides evidence of similar classes being applicable for French, Chinese and Navajo.

These observations are important for tying the current proposal in with traditional approaches to Slavic aspect. The perfective aspect, for example, is given the general characterisation of explicitly describing a completed event. This is usually the whole of the event, but in the case of procedurals it is only part of the event which is 'completed'. By identifying event phases as possible event referents in their own right means that the procedural forms can be interpreted as explicitly describing a particular event phase. Thus, 'completed event'—one of the main characteristics of the perfective—refers to the completion of a particular event phase. The relationship between this part of the event and the rest of the event is reflected in the structure of the event template, which the event phase is part of. The event templates therefore provide a framework in which the relationship between different event phases can be shown.

It has often been suggested that the two verbs *iskat'*/*najti* ('to seek/to find') should be considered as an aspectual pair in Russian because of the semantic relationship between them. In my approach, *iskat'* ('to seek') can be treated as a process expression (where *perestal iskat'* ('he stopped looking') marks the end of the process), and *najti* ('to find') can be treated as a culmination expression. An inference can be made about these two event referents indicating that the successful completion of a *seeking*-event is the same as a culmination event of finding something: a CULMIN-phase is part of the event template for both these expressions, and there is an inference that these CULMIN-phases refer to the same event reference. This kind of relationship holds for a number of verb pairs, including English ones;

for example, *to climb a mountain/to reach the summit*. Because of the aspectual system of Russian, these pairs have sometimes been proposed in the literature for the sake of uniformity on a lexical level (Forsyth 1970: 50 criticises this), but there is no proposal for this kind of linking up of different lexical items in English. The event templates show how the Russian pairs are related and provide the framework to show similar relationships between English event referents. In section 5.6 of Chapter 5, I shall indicate what sorts of inferences can be made for English along these lines.

## 2.3 Internal structure of events: event nuclei and schemata

In the previous section, it was demonstrated that there are a number of different aspectual categories to which any natural language sentence or verb phrase belongs. These categories are identified by a battery of tests which highlights the different nature of each of the categories, and these can be identified as features such as [DURATIVE ±], [TELIC ±], etc. These features have been identified and discussed by various authors (see section 2.2.1), and Vendler's terms—activity, accomplishment, achievement, and state—are often used in the literature to identify the various aspectual classes. These terms are not, however, very lucid, although features can be attached to the terms as defining features; eg, activities are [DURATIVE +] and [TELIC −]; achievements are [DURATIVE −] and [TELIC +]. Another approach is to represent the internal structure of these events in a more schematic way, for example, by identifying event phases which reflect these features. The feature [DURATIVE +] for instance effectively represents the fact that an event takes place over a period of time, and this could be named as a process phase.

In recent years, various approaches have been proposed which do precisely this: the internal structure of events is represented in terms of a schematic representation corresponding to the features mentioned above. For example, Freed (1979) proposes an event structure consisting of an onset, nucleus and coda.<sup>6</sup> Moens (1987) has a tripartite event nucleus and Smith (1991) proposes various event schemata to represent the different constituent structure of the aspectual classes (her situation type). Paducheva (1990) offers a similar kind of schema for the Vendlerian aspectual classes in Russian. Similar approaches to event ontology have also been taken up in more recent work, for example work on the discourse interpretation of event reference in Kamp and Reyle (1993).

The constituent parts of the event schemata in these approaches correspond to the features discussed in section 2.2, and are effectively a different way of categorising the aspectual classes. However, the constituent parts are motivated by linguistic data, and can be taken as the basis of a more detailed analysis of aspect, since viewpoint aspect (eg, the distinction between *John wrote the letter* and *John was writing the letter*)—and other aspectual phenomena—can be analysed in terms of

the event schemata.

In the next section (section 2.3.1), I shall review the motivation behind Moens' tripartite event nucleus and his choice of terminology to describe the aspectual classes. Following that (section 2.3.2) I review Smith's temporal schemata. Having argued in favour of this kind of representation for aspectual class, in section 2.4 I shall discuss how insights from the two approaches can be taken to produce a set of event templates, which will be used in the analysis of aspect in the following chapters. This section shows the relationship between Moens' tripartite event nucleus and Smith's schemata, bringing together the terminology and clarifying the relationships between the proposed event phases which make up the event templates.

### 2.3.1 Motivating Moens' set of aspectual classes and tripartite event nucleus

Moens (1987) takes Vendler's classification of aspectual class as a starting point, and introduces a new but related taxonomy of events which is used throughout his thesis. The classification is very similar to Vendler's, apart from the addition of a new class (point events) and the renaming of the terminology. Moens' terminology is more transparent, and also reflects the terminology used for the component parts of the tripartite nucleus (see Figure 2.5), which he presents as a background structure used for all aspectual classes. The correspondence between terms used by Vendler and Moens is shown in Figure 2.3.

The concept of the nucleus relates to “the nature of the temporal and aspectual information conveyed by a verbal expression” (Moens 1987: 48), ie it reflects the internal structure of events referred to by verbal expressions. However, only certain components of the nucleus are related to any given aspectual class.

Events referred to in natural language correspond to one of the aspectual classes. The internal structure of these events is reflected by the nature of the respective aspectual class. For example, culminations are perceived as instantaneous whereas processes are perceived as having duration (related to the feature [DURATIVE ±]); culminated processes end with a culmination whereas processes do not (related to the feature [TELIC ±]).

Moens' categorises aspectual class along these lines, which facilitates viewing

Vendler's	Moens'
activity	process
accomplishment	culminated process
achievement	culmination
—	point
state	state

Figure 2.3: Classifications of aspectual classes

<sup>6</sup>This work is discussed in Chapter 3, section 5.2.1.

aspectual class in terms of his tripartite nucleus. It also allows the relationship between the different aspectual classes to be highlighted and, as will become evident in Chapter 3, this is crucial to demonstrating how the aspectual class of verbal expressions can change in certain contexts.

Along with the distinction that Vendler draws between extended and atomic events, Moens introduces distinctions between events and states. These distinctions are shown in Figure 2.4, which categorises events by whether they have consequences—[CONSEQ  $\pm$ ] related to the feature [TELIC  $\pm$ ]—and whether or not they are extended (punctual vs durative, or atomic vs extended). From the [CONSEQ  $\pm$ ] and [ATOMIC  $\pm$ ] distinction, a new class of events is introduced, called point events, which is motivated by the contrast in behaviour of verbs like *recognise* and *hiccough*.

The new terminology illustrates more clearly the relationship between events in terms of their internal structure. The internal structure of events is illustrated diagrammatically by Moens with the tripartite event nucleus, introduced in Figure 2.5. Processes (Vendler's activities) are distinguished from culminated processes (Vendler's accomplishments) by the feature [CONSEQ  $\pm$ ], which is related to the culmination (always followed by a consequent state in Moens' ontology). Culminated processes are distinguished from culminations (Vendler's achievements) by the atomic/extended distinction: Moens characterises culminated processes as an extended event ending with an instantaneous culmination, whereas culmination events consist only of an instantaneous culmination event. The opaqueness of Vendler's terminology is removed by Moens' terminology, which more clearly reflects the internal event structure. I shall use Moens' terminology throughout this thesis.

It has long been observed that aspectual class can vary from sentence to sentence depending upon the kind of subject or object NP (eg singular vs plural) or whether an optional prepositional phrase is included in the sentence. For example, in

- (2.49) a. Max ran.  
b. Max ran to the station.

(2.49a) is a process expression and (2.49b) is a culminated process expression;

	EVENTS		STATES
	atomic	extended	
+conseq	<b>culmination</b> <i>recognise, spot</i> <i>win the race</i>	<b>culminated process</b> <i>build a house,</i> <i>eat a sandwich</i>	<i>understand</i> <i>love, know</i> <i>resemble</i>
−conseq	<b>point</b> <i>hiccough,</i> <i>tap, wink</i>	<b>process</b> <i>run, swim, walk,</i> <i>play the piano</i>	

Figure 2.4: Moens' categorisation of aspectual class

the presence of the prepositional phrase *to the station* changes the aspectual class of the whole sentence.

Moens' event nucleus and aspectual network provides a framework which represents these changes and constrains the possible changes so as to reflect the aspectual class alternations possible in sentences of English. Moens' aspectual network (which is discussed in Chapter 3) contains each of the aspectual classes depicted in Figure 2.4 and indicates possible transitions from one class to another. In the case of (2.49), *Max ran* is classed as a process expression, and *to the station* corresponds to a goal or end. A goal relates to a culmination point in terms of the event nucleus referred to by the linguistic form. So the addition of *to the station* to *Max ran* changes the aspectual class of the sentence from process to culminated process. This is one of the possible transitions in Moens' aspectual network.

Returning to the classification of the aspectual classes as shown in Figure 2.4, Moens suggests that each of the aspectual classes in the network is associated with a nucleus consisting of three parts: a preparatory process, culmination point (marking the end of the event) and consequent state (which is a state following the end of the event), depicted diagrammatically in Figure 2.5.

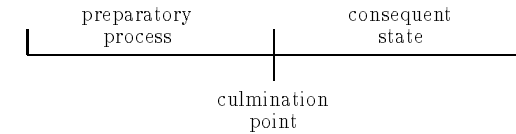


Figure 2.5: Moens' tripartite event nucleus

This highlights the relationship between the culmination point mentioned in the context of (2.49b) and the process event in (2.49a). (2.49a) is a process expression, and in Moens' analysis is associated with the preparatory process component of the nucleus: "a process expression only pertains to the (preparatory) process" (Moens 1987: 48); (2.49b) is a culminated process expression and is associated with the whole of the nucleus: the preparatory process component, the culmination point and the consequent state component which is always associated with and directly follows a culmination point.

Moens presents the nucleus as a diagrammatic representation of an ontology required to refer to the internal structure of events in natural language. For any given event expression, part (or all) of the nucleus is "conjured up" (Moens 1987: 48). For any given event expression, all the required components are available in the nucleus, but only those relevant to a particular aspectual class are picked out in the interpretation of the sentence. In many cases not all the components are required to reflect the event described in a given sentence. As stated above, "a process expression only pertains to the (preparatory) process" and therefore does not describe the culmination point. The culmination point does not always feature for a given sentence because "the preparatory process leads up towards but does not necessarily

reach a culmination point". A culmination point is not associated with a process expression.

In section 2.4, I introduce separate event templates associated with each of the aspectual classes and containing only those components relevant to that aspectual class. In the interpretation of a sentence, the template for the aspectual class of that sentence forms part of the semantic interpretation. The other components of the nucleus are irrelevant for that interpretation. A template therefore serves to represent the conceptual structure the event which is evoked by a language user when she or he utters a sentence. For example, a process expression evokes a preparatory process phase from the nucleus, but not the culmination point. For this reason, the culmination point should not feature in the underlying representation of a process expression, and does not feature in the event templates proposed in section 2.4.

Moens' nucleus shows what components are necessary to represent aspectual class; the event templates reflect a more specialised representation for each of the aspectual classes and each one is a subset of the nucleus. When separate components of the tripartite nucleus are taken for each of the aspectual classes, it transpires that further nuances are required to accurately reflect the nature of the event reference for each of these classes. Taking each of the aspectual classes in turn, I shall suggest what additional or different components are required.

### 2.3.1.1 Process expressions

A process expression has no culmination point associated with it. If this is the case, then what is 'preparatory' about the process of Moens' nucleus? I shall name the durative component of a process expression simply process phase (PROC-phase), rather than preparatory process. When the process event ends, if a process expression has no culmination point in its structure, what kind of phase marks the end of the process, and what happens after this phase? Moens does not address the question of what constitutes the end of a process if it does not culminate, but there is evidence that this phase is perceived as being punctual and marking a change from one durative phase to another, just like the culmination point. The end of a process expression (such as, *John played in the garden*), can be explicitly described by the aspectual verb *stop*: *John stopped playing in the garden*, and *stop* is a culmination expression (as will be shown in Chapter 5), which is perceived as being punctual. When a process event comes to an end, a state follows; not a consequent state, since the perfect cannot normally be used with process expressions (*?John has played in the garden*), but an ordinary state.

The bound of a process expression is therefore different from the culmination point (a CULMIN-phase), and this will be referred to as final bound phase (F-BOUND-phase). A final bound phase is followed by a state phase (STATE-phase), rather than a consequent state phase (compare Figure 2.5), which highlights the distinction between process and culminated process expressions.

### 2.3.1.2 Culminated process expressions

Culminated process expressions are associated with the whole of the nucleus, and therefore I propose a template for these expressions which is very similar to the nucleus: the preparatory process is preparatory to the culmination point which marks the completion of the event referred to. But what is the status of the point or bound which marks the start of the preparatory process?

The event templates motivated in section 2.4 provide a more detailed characterisation of the internal structure of event referents in natural language. Again, there is evidence from aspectual verbs that the preparatory process must be bounded to its left: *John started writing the letter* explicitly describes the beginning of the event. Moens indicates the beginning of the preparatory process with a mark, but does not give any further details about its status. This is not necessary for his analysis using the aspectual network<sup>7</sup>, since the nucleus is sufficiently detailed to accommodate the transitions which he proposes. However, in providing a more detailed analysis of the component phases required for each of the aspectual classes, I shall demonstrate that a wider range of data relating to aspectual phenomena can be accounted for. The beginning of the process phase is given the same status as the other phases, and is referred to as the initial bound phase (I-BOUND-phase).

### 2.3.1.3 Culmination expressions

Introducing an I-BOUND-phase raises questions about the required representation for culmination expressions. In Moens' analysis, culmination expressions pick out just the culmination point, represented by the CULMIN-phase, as described above. Culmination expressions are perceived as instantaneous, and it is unclear exactly what the nature of the preparatory process component of the nucleus would be. Presumably, in the case of culmination expressions, it is indeed preparatory to the event's occurrence, but I have suggested that for durative event references (ie, process and culminated process expressions), this phase should be termed simply PROC-phase. Also, what is the status of the mark starting the preparatory process? If culmination expressions are punctual, then presumably just a CULMIN-phase is necessary to represent this aspectual class. This is the interpretation given at this stage, but in Chapter 4, this representation is developed further to account for other data, and to show the relationship between culmination and culminated process expressions. In that chapter, I motivate an internal structure for culminations whereby a durative structure can be expressed in certain contexts.

The suggestions made for a more detailed characterisation of the component phases of an event nucleus follow from Moens' informal discussion of which parts of the nucleus are picked out for interpretation in his analysis. They also reflect intuitions about the different characteristics of the aspectual classes. This kind of analysis is reflected in other work on aspectual interpretation, and in particular work by Smith (1991), who uses the term situation types for Vendler's taxonomy of

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<sup>7</sup>Discussed in Chapter 3.

aspectual classes. I shall continue using the term aspectual class, to allow for easier comparison between approaches.

### 2.3.2 Smith's temporal schemata

Smith (1991) develops a theory of aspect interpretation with two main components: temporal schemata which reflect the internal structure of events, and the interpretation of viewpoint aspect which identifies a part or all of the schema for a particular aspectual class as being relevant for a particular sentence. For example, the contrast between *John wrote the letter* and *John was writing the letter* is made by representing both sentences with the same temporal schema, but in the former the whole of this schema is "in focus" whereas only the durative part of it is in focus in the latter.

Smith's temporal schemata are also based on Vendler's taxonomy, and correspond to the features discussed in this section: duration vs punctual, and telic vs atelic. She uses the same types of linguistic tests as much other work on aspectual class, referring to the following work: Ryle (1949) and Vendler (1967); also Mourelatos (1978), Dowty (1979) and Smith (1983). She notes which aspectual classes can be identified as linguistic categories, forming a set of covert categories in that "they have a distinctive set of co-occurrence properties" (Smith 1991: 27) on a semantic level, but do not necessarily have any distinctive morphological or syntactic features. This set of co-occurrence properties corresponds to the tests for aspectual class discussed in section 2.2.2.

Smith uses Vendler's terms, and identifies the following primitives for the schemata: I,  $F_{Arb}$ ,  $F_{Nat}$ , 'undifferentiated period of states', and 'successive stages of events' (Smith 1991: 30). The symbols I and F correspond to 'endpoints': initial endpoint, arbitrary final endpoint and natural final endpoint. I and F can be separated by a durative period, corresponding to the 'successive stages of events' (characterised by a dotted line in Smith's schemata, as in Figure 2.6). Activities (Moens' process expression) and accomplishments (Moens' culminated process expression) are distinguished by different final endpoints: the former ends with  $F_{Nat}$  and the latter with  $F_{Arb}$ . 'Undifferentiated periods of state' precede and follow the endpoints.

I ..... F

Figure 2.6: Smith's event schema for durative events

Smith characterises achievement expressions with an event schema where I and F coincide, shown in Figure 2.7. This corresponds to the culmination point in Moens' nucleus.

Comparing the representation for durative events (Figure 2.6) with the preceding discussion, a one-to-one correspondence can be made between I and I-BOUND-phase,  $F_{Arb}$  and F-BOUND-phase, and  $F_{Nat}$  and CULMIN-phase. The successive stages of the event correspond to the PROC-phase. The terms I have introduced (I-BOUND,

... I (R) ...  
F

Figure 2.7: Smith's event schema for achievement expressions

F-BOUND, CULMIN and PROC-phase) will be used in section 2.4 as features which represent the internal structure of events in a feature structure representation.

The choice of terms is intended to reflect components from both Smith's and Moens' approaches: the CULMIN-phase corresponds to Moens' culmination point and Smith's  $F_{Arb}$  final endpoint; the I-BOUND-phase corresponds to the point marking the start of a preparatory process phase (which he does not name), but which relates to Smith's I initial endpoint.

Smith characterises achievement expressions with the schema given in Figure 2.7, where I and F are co-temporal, thus representing a punctual-type event reference, followed by a resultative state (indicated by R in the schema). I characterise the punctual-type reference by the CULMIN-phase, corresponding to Moens' culmination point. This is motivated by the behaviour of culmination expressions with the perfect, which describes the consequent state following a culmination point (*John had arrived*); this implies that the final endpoint in Figure 2.7 would be a natural final endpoint ( $F_{Nat}$ ). Culmination expressions are the topic of Chapter 4, and more detailed discussion about the structure of culminations is given there. For current purposes, the representation of culmination expressions by CULMIN-phase is sufficient.

## 2.4 Event templates: extending the tripartite nucleus

Following from the discussion in the previous two sections (sections 2.3.1 and 2.3.2), in this section I shall show how the event phases proposed can be combined in the form of event templates, reflecting elements from Moens' tripartite nucleus and Smith's temporal schemata.

In this section, I present diagrams to show how the event phases (ie, the phases like I-BOUND-phase and CULMIN-phase mentioned in the previous section) relate to each other, and how they differ for each aspectual class. In section 2.5, these diagrams are interpreted as values in feature structure representations in which a feature value event structure (EV-STR) has values corresponding to event phases. This allows the information to be manipulated for syntactic and semantic analysis of aspect. The temporal ordering of event phases represented by the horizontal lines in the diagrams is given in terms of constraints on the temporal interpretation of the event phases (section 2.5.2).

The event phases motivated here (1) show how the representations of aspectual class in Smith' and Moens' approaches are related, and (2) provide the necessary

categories for the feature structure analysis introduced in section 2.5 and employed for the analysis in the following chapters. The event phases and event templates will be used in the feature structure representation to account for viewpoint aspect in a similar way to Smith (the topic of Chapter 3), but will also be used to investigate the properties of culmination expressions (Chapter 4), and aspectual verbs (Chapter 5). For that reason, the ontology of event phases developed here is more detailed than Smith's (eg, the phase between I and F is referred to explicitly as **PROC**-phase, and a **CONSEQU-STA**-phase is introduced). The representation also extends Moens' tripartite nucleus (eg, the **I-BOUND**-phase is referred to explicitly).

#### 2.4.1 Templates for process and culminated process expressions

In sections 2.3.1.1 and 2.3.1.2 it was suggested that process expressions should consist of an **I-BOUND**-phase followed by a **PROC**-phase, and that process expressions end with an **F-BOUND**-phase and culminated process expressions end with a **CULMIN**-phase. This corresponds to Moens' discussion of how reference is made to the tripartite event nucleus, but I introduce labels for the different kinds of bounds delimiting the **PROC**-phase. Smith's characterisation of aspectual class was discussed in section 2.3.2, where I indicated how the event phases suggested here correspond to Smith's schemata.

The diagrams representing event templates for process and culminated process expressions are given in Figures 2.8 and 2.9. I give here some motivation from the linguistic data for representing event phases explicitly within the diagrams.

It is easy to test the supposition that the start of a process should be marked for the purposes of a linguistics ontology: If John plays in the garden, there is a time when he starts playing, described in (2.50a); following this *beginning*-event, (2.50b) is true, and prior to this, (2.50c) is true. The start of an event is indicated by the **I-BOUND**-phase.

- (2.50) a. John began to play in the garden.  
 b. John was playing in the garden.  
 c. John was not playing in the garden.

This transition between an event not holding to an event occurring (a transition from a state to an event) is often described as a change of state. Another change of state is the transition from a process event (event) to a consequent state, marked by Moens with a culmination point. Note that there is a distinction between the culmination phase in an event template (referred to as **CULMIN**), which is one of the event phases, and the aspectual class culmination, which consists of a template with just the phases **CULMIN**, as suggested in section 2.3.1.3. Both are **CULMIN**-phases because reference to templates with these phases can be made with the perfect aspect (in English); eg, *John had written the letter*; *John had arrived*.

Returning to the start of the event, this is referred to as the initial bound of a process. Prior to the initial bound a state obtains: a state of the process not taking place.

- (2.51) John was about to play in the garden.

(2.51) refers to a period just before the initial bound, and is a stative expression; however, the initial bound does not necessarily take place. For example,

- (2.52) John was about to play in the garden when he was asked to run an errand.  
 When he got back it was raining so he played inside all afternoon.

The expression *be about to* has a complement verb phrase (*play in the garden*) corresponding to an event of aspectual class process. Although this process-type event is not necessarily realised in reality, the concept of this particular event becomes part of the conceptual representation that is invoked when a sentence such as (2.51) or (2.52) is uttered. The prototypical event type is process, relating to a *playing*-event, whether or not a token event of this type is realised in the real world, is involved in the semantic interpretation of the sentence.

The time explicitly described by the sentence is prior to the event, and therefore no commitment is made with respect to the event's existence. If a time after an event's occurrence is described, then the event must have taken place. From this it follows that an event type referred to relates to a token event in the world if it falls before the time which is explicitly described, but is not necessarily realised if it falls after the explicitly described time. In the thesis this distinction will be drawn by implication from the proposed feature structures, where there is an explicit relationship between the event phases 'referred to' and the parts of the event templates which are 'explicitly described'<sup>8</sup>; only that part which is explicitly described is what is observed to take place in the world; any part of the template occurring after that does not necessarily happen.

In the above discussion, I introduced the two phases initial bound (**I-BOUND**) and final bound (**F-BOUND**). The diagram in Figure 2.8 represents the event template for process expressions which consists of the following phases: initial bound, process, final bound. Prior to the initial bound, a state phase obtains, although this is not an integral part of the process event. Final bound phases mark the point at which the process is perceived to stop; it is not necessarily an instantaneous phase, but is often presented as such by linguistic expressions such as (2.53). In the analysis in this chapter, the final bound phase is presented as an instantaneous phase.<sup>9</sup>

- (2.53) John stopped playing in the garden.

<sup>8</sup>This distinction between the event phases *referred to* and the part which is *explicitly described* is made in Chapter 3.

<sup>9</sup>In Chapter 5, a full account is given of aspectual verbs, such as *stop*, where it will become clear how these verbs can be presented as taking time.



The final bound phase contrasts with the culmination point introduced by Moens, which marks the completion of an event (for example, *John finished writing the letter* describes a CULMIN-phase associated with a culminated process expression; compare Figure 2.9). Moens argues that a consequent state obtains after a culmination point, and that the English perfect aspect explicitly describes part of this state. The perfect aspect is usually not felicitous with process expressions, and this is accounted for by process expressions not having a related consequent state. I therefore postulate that an ordinary state phase obtains after a final bound (marking the end of a process phase). Therefore, the template for process expressions can be represented diagrammatically as in Figure 2.8.



Figure 2.8: Event template for process expressions

This template contrasts with that postulated for culminated process expressions, where the **PROCESS**-phase is followed by a **CULMIN**-phase, which in turn is followed by a consequent state phase. I often describe the events referred to by these templates (ie, processes and culminated processes) as durative events, since they include a **PROCESS**-phase (or **PROC**-phase), which indicates that the events take place over a period of time. The exact time scale of this period varies depending on the event referred to.

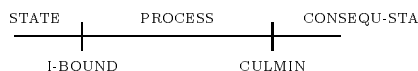


Figure 2.9: Event template for culminated process expressions

Having motivated the make-up of templates for the aspectual classes process and culminated process, I shall now consider the possible structure of templates representing culminations and points. I have suggested that the internal structure of processes and culminated processes can be represented by two separate event templates, which correspond to parts of Moens' tripartite event nucleus. I added some extra phases in modifying the nucleus for each of the new templates.

This approach is not in conflict with Moens' approach, since he offers the nucleus as a generalised structure, parts of which are focused on to represent each of the aspectual classes. In proposing the templates I have simply specified more precisely what specific structures each of the aspectual classes reflect individually by factoring out the relevant event phases. These event phases correspond to the components of Smith's event schemata.

## 2.4.2 Templates for culmination and point expressions

Turning to culminations, Moens states that the culmination point in his nucleus corresponds to the event itself, with a related consequent state phase following: "culmination expressions focus on the culmination point and its consequences" (Moens 1987: 48), ie just this part of his nucleus is picked out. The preparatory process precedes the culmination event. I take issue with the claim that a preparatory process precedes the culmination phase. Surely, any time before the occurrence of an instantaneous event is not a preparation for that event, but a state in which the event in question has not taken place (for example *John has not arrived*). If the time before the event is a preparation, then how far back in time does this preparatory phase extend? And is there a state prior to this preparatory phase which can be referred to without any implications for the event in question? The question of what the initial bound is and where it lies is again raised. One possibility would be to postulate the same template for culminations as that for culminated process events. This is a plausible option, except that generally culminated process events are perceived to take some time whereas culminations are instantaneous, as was shown in section 2.2.2. It may not be necessary to draw this distinction in terms of event templates because the time scale of any of the templates is dependent on world knowledge about how long the event in question typically takes. The categorisation of aspectual class is intended to differentiate linguistic behaviour of different kinds of event reference, and the time scale of those particular events does not appear to affect this categorisation.

Smith proposes an event schema where the initial and final end points occur concurrently, implying an instantaneous event since there are no stages between the two endpoints. This effectively represents culminations as culminated processes but with the period between the endpoints conflated to an instant of time. I stated above, culminations are perceived to occur instantaneously, and this can be reflected equally as well by associating just the culmination phase with the event, conveying the intuition that culmination expressions refer to events in the real world. In contrast, initial bound, process and culmination phases are all integrally associated with culminated processes events. This durative vs instantaneous distinction is reflected in the linguistic behaviour of sentences belonging to the two classes:

- (2.54) a. John wrote the letter in two hours. (culminated process)  
 b. John arrived in two hours. (culmination)

Culminated processes generally take some time and this can be quantified by *in*-adverbials. In (2.54a), the time denoted by the *in*-adverbial refers to the extent of the *letter-writing*-event, whereas for the culmination *arrive*, the *in*-adverbial refers to the time leading up to the event. *In*-adverbials are not always felicitous with culminations in the simple past, but they are with culminated processes.

The perceived instantaneity of culminations is further evidenced by the interpretation of sentences with *at*-adverbials, which refer only to instantaneous phases. Again, there is a distinction to be drawn between sentences of aspectual class culmination and culminated process. The *at*-adverbial refers to the precise time of the event's occurrence with culminations (see example 2.55).

(2.55) John left the house at 2pm.

For culminated processes, it is not possible to refer to the whole of the event with an *at*-adverbial because culminated processes have duration. If *at*-adverbials are felicitous with culminated processes (in the simple past), and they often sound odd since they usually have an interpretation of “around” the particular time, or the durative event is understood to take very little time. For example, if (2.56a) has an interpretation, then *at 2pm* refers to the whole of a very short *letter-writing*-event, or to its start. Writing a note is more easily perceived as taking very little time, and the *at*-adverbial is more acceptable in (2.56b), although *write a note* generally patterns as a culminated process expression. An example of a culminated process where the *at*-adverbial refers to the culmination is given in (2.56c).

- (2.56) a. John wrote the letter at 2pm.  
 b. John wrote the note at 2pm.  
 c. If you want your dog back, go to the phone box at 2pm.

The particular phase explicitly described by *at*-adverbials with culminated processes depends on pragmatic information about the event referred to.

From these examples, there is evidence for the event template for culminations to consist simply of a culmination phase.<sup>10</sup> A culmination has consequences related to it (because of the availability of the perfect aspect), so the proposed template for culminations is as in Figure 2.10.

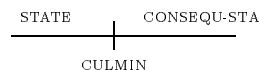


Figure 2.10: Event template for culmination expressions



Figure 2.11: Event template for point expressions

This contrasts with the event template for point expressions which do not have an associated consequent state and consists just of a BOUND-phase (not a CULMIN-phase), as shown in Figure 2.11.

<sup>10</sup>But see chapter Chapter 4 where it is argued that in some contexts a representation is required where culminations take time to occur, and I argue for a second level of structure subordinate to the instantaneous CULMIN-phase, which can be exposed in these contexts.

## 2.4.3 Template for state expressions

In the previous sections event templates have been proposed for each of the event expressions given in Figure 2.1 on page 13 leaving state expressions remaining. In terms of linguistic interpretation, states consist of a single period of time which obtains for an unspecified period of time if referred to by the simple aspect in English or the imperfective aspect in Russian. The English progressive and Russian perfective are not available for stative expressions, which is one of the traditional tests for statives (see section 2.2.2.1). The perception of states as an ongoing, unbroken period as described in English and Russian is reflected in the following tests.

*John loved Mary on Monday*, for example, holds during the described reference time (indicated by the temporal adverbial, *on Monday*). But there is an inference that he loved her before and after that time, unlike an event reference such as *John played in the garden on Monday*, which is inferred as taking place at some time on that day, and being confined to some time within that temporal period.

States can be bounded by an adverbial, *eg for 2 years*, but there is no direct inference that a stative expression is restricted by a period of time. *John loved Mary* can mean forever, although *John love Mary for two years* is felicitous and further specifies features (ie, the temporal extent over which the state obtains) which apply to the stative expression. Such a time period may be inferred from pragmatic information, or explicitly expressed in a temporal adverbial. In contrast, activities or processes always carry an implied temporal restriction because they typically cannot carry on forever. For example, from the sentence *John played in the garden* it can be inferred that he started and stopped playing at some point (reflected in the event templates by the inclusion of an I-BOUND and F-BOUND). States require further context to specify the start and end points if they have them. The template proposed for state expressions is the same as that given by Smith (1991) and consists of a period during which the state obtains, which can optionally be bounded by an I-BOUND and F-BOUND (indicated by bracketed bounds).

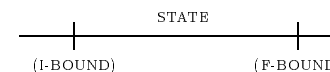


Figure 2.12: Template for state expressions

This template corresponds to a feature structure where the value of STATE is OBTAINS, discussed in section 2.5. The bracketed bounds are realised linguistically by inceptives or terminatives, or aspectual verbs (such as *start* and *stop*), but such expressions are not available for all states. The following are examples of (a) stative expressions and (b) corresponding achievement expressions which correspond to a change of state indicating the start or end of a state period, and which explicitly describes either the I-BOUND or F-BOUND of the state template.

- (2.57) a. John felt ill.  
b. John started to feel ill.
- (2.58) a. John was happy.  
b. John stopped being happy.
- (2.59) a. John loved Mary.  
b. John fell in love with Mary.

## 2.5 Feature structures

In this section I present a set of feature structures to represent the event templates motivated in section 2.4. The feature structures are constructed in the spirit of the HPSG sign-based grammar formalism (Pollard and Sag 1994), and are intended to form the basis of an extension to that formalism which will account for the semantics of aspectual and temporal phenomena in natural language. At this stage, I introduce the feature 'event structure' (abbreviated to **EV-STR**) to represent the event templates, with various values to reflect the phases of the event referred to. An additional feature 'described' (**DESCD**) will be introduced Chapter 3 to account for viewpoint aspect; the feature **DESCD** is related to values which refer to event phases of the event template which are 'explicitly described' in a sentence by viewpoint aspect. These features which are new to HPSG interact in the formalism like other features. In this way, it is shown how viewpoint aspect is related syntactically to certain participles and other verb forms, while a semantic interpretation can also be given. I then extend the analysis of event templates to capture observations about culmination expressions (Chapter 4), and aspectual verbs (Chapter 5), and present an account of these within the same framework.

### 2.5.1 Event templates as feature values

HPSG is a theory of natural language syntax and semantics which brings together analyses of the syntactic structure of sentences and a semantic interpretation of those structures within one representational framework. Information is presented in terms of feature structures which represent information at various levels of structure. A word or phrase of a language is represented as a sign, with at least the attributes phonology (**PHON**), syntax-semantics (**SYNSEM**) and daughters (**DTRS**) in the case of phrases. **SYNSEM** in turn contains the attributes category (**CATEGORY**), content (**CONTENT**) and context (**CONTEXT**). The values of **CATEGORY** reflect the syntactic structure of the word or phrase, and **CONTENT** is concerned with linguistic information relating to the semantic interpretation. The relationships holding between information is indicated in HPSG by structure sharing, and in this way, syntactic and semantic components of the analysis can be interlinked. For example, semantic information about the agent of a sentence (a value of **CONTENT**) can be co-indexed with the subject noun phrase (a value of **CATEGORY**), indicating that the values

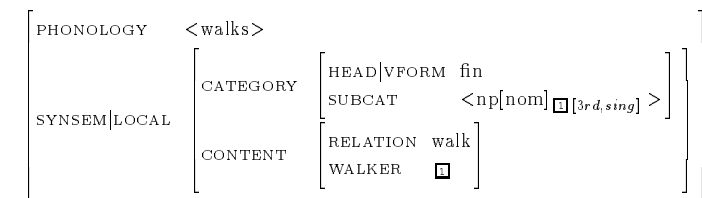


Figure 2.13: Pollard and Sag's (1994) representation of *walks*

of each of these attributes are token identical. Much work on HPSG has focused on syntactic issues, with an indication of how the semantic interpretation would be made. In this section, I shall suggest what features of **CONTENT** could be added to reflect semantic information about the aspectual structure of events. This information will be given as additional features to an HPSG analysis, and effectively shows how the theory could be extended to account for aspectual phenomena. The feature structures used are fairly schematic, and show the attributes and values required for the analysis, plus syntactic information about a phrase. Where the feature structures become difficult to read, a commentary is given to explain how the different parts are interrelated.

The lexical entries for individual verbs will reflect the event templates which are discussed in section 2.4. They are based on Pollard and Sag's proposal for the representation of a verb form (the third person singular present tense of *walks*, Pollard and Sag 1994: 82), which is shown in Figure 2.13.

This sign is a representation of the syntactic and semantic features of a finite verb form which subcategorises for, or selects, a subject noun phrase ( $\text{np}[\text{nom}]$ ).<sup>11</sup> The semantic interpretation (values of **CONTENT**) reflects the fact that the verb refers to a walking relation and a walker, whose values ( $\boxed{\phantom{\text{[3rd, sing]}}}$ ) are the same as the semantic interpretation of the subject noun phrase (indicated by the subscripted  $\boxed{\phantom{\text{[3rd, sing]}}}$  associated with  $\text{np}[\text{nom}]$ ). Furthermore, the subject noun phrase must carry values for agreement, indicating the third person singular, abbreviated as  $[\text{3rd, sing}]$ . The abbreviation  $\text{np}[\text{nom}] \boxed{\text{[3rd, sing]}}$  represents an expanded sign with its own **SYNSEM** values, **CATEGORY** values, etc. For convenience, this sign is presented in its abbreviated form here. Similarly the sign for *walks* can be abbreviated, as shown in (2.60). Conventionally, signs are presented in their abbreviated form or in an underspecified form for expository reasons.

$$(2.60) \quad \text{verb}[\text{fin}, \text{SUBCAT} \langle \text{np}[\text{nom}] \boxed{\text{[3rd, sing]}} \rangle] \boxed{\phantom{\text{[3rd, sing]}}}$$

<sup>11</sup>In Pollard and Sag (1994), the feature **SUBCAT** is used up to Chapter 8; in Chapter 9, Pollard and Sag draw a distinction between values of **SUBCAT**, separating values of **SUBJ** and **COMPS** (subject and complements respectively). I use **SUBCAT** throughout since this does not affect my analysis.

where  $\square$  is the semantic interpretation of the subject noun phrase, and  $\square$  represents the values of **CONTENT** in Figure 2.13.

The values of **CATEGORY** represent syntactic information about the verb, and I shall use this unmodified. Information about aspectual class, or event structure of the verb, can be introduced as a value of **CONTENT**. The new feature—**EV-STR**—is introduced as a value of **CONTENT**, representing the event templates described in section 2.4. **EV-STR** contains values corresponding to the event phases. These phases are **I-BOUND** (initial bound phase), **PROC** (process phase), **F-BOUND** (final bound phase), **CULMIN** (culmination phase), etc. The valid combination of phases is restricted (informally in this section) to those given in the feature structures. However, the feature structure representation does not discriminate ordering between values of a particular attribute, and although the respective phases for a particular template can be given as a value of **EV-STR**, constraints on the ordering of event phases are necessary (1) to indicate the temporal ordering of the phases and (2) to indicate the interrelationship between certain of the phases. These further interpretations on the feature values in the sign are discussed in more detail in section 2.5.2.

### 2.5.1.1 Representation of culminated process expressions

Taking the example of the transitive verb *write*,<sup>12</sup> which is a culminated process expression, the value of **EV-STR** will consist of the three phases **I-BOUND**, **PROC** and **CULMIN**.

These event phases are related to the event that they refer to via a further feature value describing the action. For example, **I-BOUND** describes the **START-OF** the corresponding event. Let  $\square$  be the representation for the event described, ie here the event of *writing*. A full representation of **I-BOUND** which refers it to this event would be

$$(2.61) \quad [\text{I-BOUND} | \text{START-OF } \square]$$

where **START-OF** is the value of **I-BOUND** and  $\square$  is the value of **START-OF**, indicating that the initial bound of an event refers to the start of the event described ( $\square$ ). The feature value **I-BOUND** is one of the features for culminated process expressions associated with **EV-STR** indicating that these expressions include the start of the event referred to.

This detail of representation allows us to generalise about the event phases constituting the structure of aspectual classes, while making an explicit reference to the event described by the event reference.

<sup>12</sup>Compare the transitive *write*, as in *John wrote a letter*, which is a culminated process expression with the intransitive *write*, as in *John wrote (and wrote)* which is a process expression. I assume separate lexical entries for these two forms since I do not give a detailed analysis of the internal semantics of the verb phrase.

Similarly for the process phase and the culmination phase of an event, a value is associated with these phases indicating what part of the event is described by those phases: the process phase describes an event ( $\square$ ) which is in the process of taking place (**IN-PROCESS-OF**  $\square$ ), giving the following representation:

$$(2.62) \quad [\text{PROC} | \text{IN-PROC-OF } \square]$$

and **CULMIN** takes a value **FINISH-OF**  $\square$ , to indicate the finish or conclusion of the described event:

$$(2.63) \quad [\text{CULMIN} | \text{FINISH-OF } \square]$$

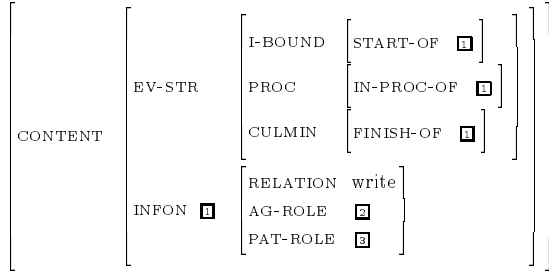
Associated with each event phase is therefore a description of what part of the event is being referred to. These event phases are the values of **EV-STR**; see that part of the sign given in Figure 2.14.

Pollard and Sag's characterisation of the third person singular present tense verb representing *walks* (Pollard and Sag 1994: 82) contains a **CONTENT** attribute with two values: **RELATION** and **WALKER**, and these values represent the event described. In accounting for determiners, quantifiers, etc these values are manipulated further and embedded as values of **RESTR**, which in turn can be the value of **QSTORE|RESTIND**, etc. I do not give a detailed account of quantification, since the emphasis will be on the aspectual interpretation of verb phrases and sentences. However, reference to the event is crucial, and I modify Pollard and Sag's representation slightly, factoring out the event reference from the values of **CONTENT**. I introduce a new value **INFON**, which subsumes **RELATION** and reflects the thematic roles associated with that relation. For example, **AG-ROLE**, **PAT-ROLE**, etc. It is the values of **INFON** which identify the event reference, and these are the values which are structure shared with  $\square$  in the examples above (ie, in 2.61). By factoring out these values, the whole of the event reference can be co-indexed with  $\square$ .

The feature **EV-STR** (reflecting the event template for a given expression) is introduced into the sign as a value of **CONTENT**, ie it is part of the semantic interpretation. The value of **CONTENT** for culminated process expressions is given in Figure 2.14.

Taking Figure 2.13 as a model, and incorporating the values for **EV-STR** and **INFON** into the sign, the representation for for the base form of *write* is given in Figure 2.15. Note that  $[\text{HEAD verb} | \text{bse}]$  is an abbreviation of  $[\text{HEAD} | \text{VFORM bse}]$ . The values of the thematic roles are cross-referenced with the semantic values of the verb's nominal complements (a sub-scripted index, eg  $\text{np}[\text{nom}] \square$ ), indicating, for example, that the agent role of a *writing*-event (the *writer*) is filled by the semantic value of the nominative noun phrase (eg the denotation of, for example, *John* in *John wrote a letter*).

In HPSG, finite forms of verbs are derived by lexical rule from the base forms. Hence, *walks* would be derived from the base form *walk*; *writes* and *wrote* from the base form *write*. Lexical rules relevant to the interpretation of aspect will be given in Chapter 3. The representation of a complete sentence is derived by various principles which determine how members of the subcat list are discharged (when, eg, a verb



where  $\boxed{1}$  and  $\boxed{2}$  indicate the semantic interpretation of the subject and object noun phrases of *write*

Figure 2.14: Feature structure showing the value of CONTENT for culminated process expressions

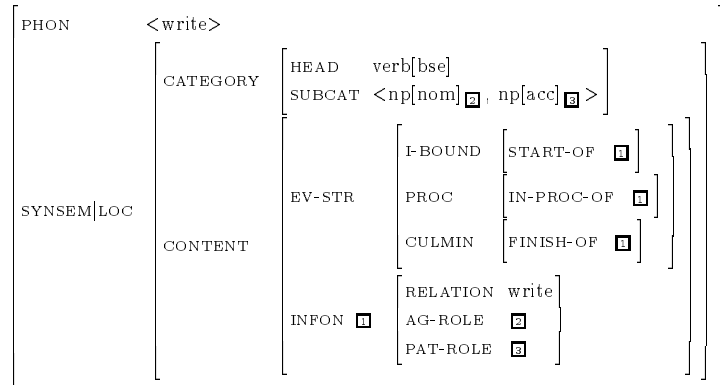


Figure 2.15: Feature structure for the verb *write*

form combines with a noun phrase), and how syntactic and semantic information is shared by various parts of the complete sign, to show the interrelationship between features. This formalism is well suited to an analysis of aspect, since much of the syntactic interpretation is in place (see Pollard and Sag 1994), and the semantic analysis developed in this thesis can be incorporated as an extension to that formalism.

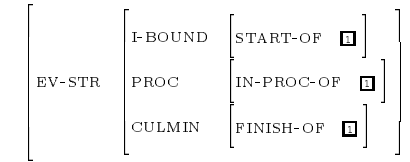
### 2.5.1.2 Representation of other aspectual classes

In section 2.4 I presented a diagrammatical representation of event templates for each of the aspectual classes. In this section, I present feature structures corresponding to these diagrams. Each of the feature values of EV-STR corresponds to a part of the diagrams in Figure 2.8–Figure 2.11. The feature structures are presented in in (2.64) to (2.66). (2.67) and (2.68) represent the feature structures for point and state expressions respectively. These final two categories are not analysed in as much detail as the other categories, which are the main focus of the analysis. Most of the analysis developed in the course of the following chapters can, however, be modified and extended to account for these classes.

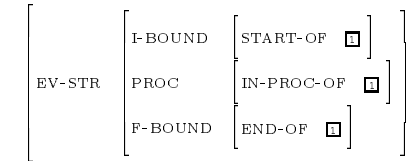
Following these examples (section 2.5.2) I shall present the restrictions on co-occurrence of the event phases (the values of EV-STR), which place the event templates in a broader context, indicating for example that a STATE-phase obtains prior to an I-BOUND-phase, that a CONSEQU-STA-phase takes place after a CULMIN-phase, etc.

In the following feature structures,  $\boxed{1}$  represents the value INFON relating to the structure of the event referred to in the sentence, eg for the verb *write* this would be the value of INFON shown in Figure 2.14.

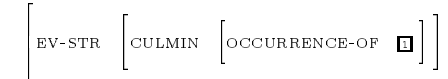
#### (2.64) Culminated process expressions



#### (2.65) Process expressions



#### (2.66) Culmination expressions



$$(2.67) \quad \text{Point expressions} \\ \left[ \text{EV-STR} \left[ \text{BOUND} \left[ \text{OCCURRENCE-OF} \left[ \square \right] \right] \right] \right]$$

$$(2.68) \quad \text{State expressions} \\ \left[ \text{EV-STR} \left[ \text{STATE} \left[ \text{OBTAINS} \left[ \square \right] \right] \right] \right]$$

From these feature structure representation, it can be seen that each of the event phases has a value relating the event phase to the value of *INFON*, ie the event reference. For respective event phases, these values are as given in (2.69).

Event phase:	Referring to:
I-BOUND	START-OF
PROC	IN-PROC-OF
F-BOUND	FINISH-OF
STATE	OBTAINS
BOUND	OCCURRENCE-OF
CULMIN	FINISH-OF
CULMIN	OCCURRENCE-OF
CONSEQU-STA	HAS-OCCURRED <sup>13</sup>

In the following section, an interpretation of event phases will be presented, giving constraints on the temporal ordering of these phases. Note that there are two types of *CULMIN*-phase. This phase was motivated by the fact that it is followed by a consequent state (*CONSEQU-STA*-phase), whereas final bounds and bounds are not. This constraint applies to both types of *CULMIN*-phase, whereas other constraints are restricted to one or other. These can be distinguished by specifying the feature value of *CULMIN* if necessary.

## 2.5.2 Constraints on the ordering of event phases

Some approaches to event semantics include an event argument (*e*). The attribute *EV-STR* corresponds to this argument, but because it can carry values itself, more detailed information about the internal structure of the event is offered to reflect the aspectual class of the given verb, verb phrase or sentence. In the current feature structure framework, the possible values of *EV-STR* need to be restricted in two ways; firstly so that only those event templates motivated in section 2.4 are admitted, since these are the only aspectual classes available in (at least) English and Russian. Secondly, a temporal ordering on the phases needs to be given, since the values of features within this feature structure representation are not ordered with

respect to each other but are given as a list. This is in contrast to the diagrammatic representation of event templates (Figure 2.8–Figure 2.11 in section 2.4), where the horizontal ordering of event phases effectively gives a temporal ordering to them. The constraints presented here show the relationship between event templates presented in terms of feature structures in section 2.5.1.2 and the diagrammatic representation of events in section 2.4.

The ordering of phases is general to all values of *EV-STR*, and can be given as a general stipulation. This effectively gives an *interpretation* of the feature structure representation with respect to the perceived realisation of the events in the world. For example, an *I-BOUND*-phase indicates the initial bound of a durative event and is therefore, by definition, followed by a *PROC*-phase; a *PROC*-phase must end at some point, and this phase is represented as an *F-BOUND*- or *CULMIN*-phase depending on whether the event ceases with no particular culmination (a process expression ending with an *F-BOUND*-phase) or finishes with a culmination (a culminated process expression ending with a *CULMIN*-phase).

From the values of *EV-STR* outlined in section 2.5.1.2, the following temporal ordering on phases can be given. This is not an imposed ordering of feature values within the representation, since unification of signs can occur as long as the shared information in any two signs corresponds. The ordering is intended to give an *interpretation* of the representation in terms of what temporal ordering the phases are perceived to have in the real world.<sup>14</sup>

I shall present the constraints on phases here in terms of temporal restrictions (where '<' indicates temporal precedence), giving an additional interpretation to the values of *EV-STR*.

C1 Given *I-BOUND* and *PROC*:

*I-BOUND* < *PROC*

C2 Given *PROC* and *CULMIN*|*FINISH-OF*:

*PROC* < *CULMIN*|*FINISH-OF*

C3 Given *PROC* and *F-BOUND*:

*PROC* < *F-BOUND*

Further to these temporal orderings, it is assumed by default that preceding and following each event expression is a state phase (*STATE*-phase), except in the case of

<sup>14</sup>For example, linguistic expressions explicitly describe certain of the phases, and the temporal ordering on those phases restrict what linguistic expressions entail another. Taking an example which will be illustrated in more detail in Chapter 3, (a) *John was writing the letter* ~~✗~~ (b) *John wrote the letter*; (a) explicitly describes a process phase of a template for culminated processes, (b) explicitly describes the whole of the template (ie, *I-BOUND*-, *PROC*- and *CULMIN*-phases); (a) does not entail (b) because the *PROC*-phase temporally precedes the *CULMIN*-phase, and since this phase has not been explicitly described in (a), on uttering (a), it is not perceived by the speaker to have occurred. This interpretation requires a constraint that *I-BOUND* < *PROC* (C1) and *PROC* < *CULMIN* (C2), where '<' indicates temporal precedence.

<sup>13</sup>Included for completeness; referred to in next section.

a CULMIN-phase, which is always followed by a consequent state phase (CONSEQU-STA-phase), giving the following restrictions:

- C4 Given CULMIN:  
 CULMIN < CONSEQU-STA  
 (ie, a consequent state phase always follows a culmination phase)
- C5 Given F-BOUND V BOUND:  
 (F-BOUND V BOUND) < STATE  
 (ie, a state phase always follows a final bound phase, or simple bound phase for point expressions. This provides a restriction for the application of the perfect, which explicitly describes a CONSEQU-STA-phase, and thus only co-occurs with an event which has a CULMIN-phase as part of its template.
- C6 Given I-BOUND:  
 STATE < I-BOUND
- C7 Given CULMIN|OCCURRENCE-OF:  
 STATE < CULMIN|OCCURRENCE-OF  
 Culmination expressions have only a CULMIN-phase as value of template, and these phases carry the value OCCURRENCE-OF. Therefore this constraint only holds for culmination expressions.

These constraints allow only the event templates presented diagrammatically in section 2.4. The relationship between these constraints and the diagrammatic representation of aspectual classes can be seen by recreating the diagrammatic representations from the constraints. For example, C1 and C3 specify that a PROC-phase is bounded by an I-BOUND-phase and an F-BOUND-phase; C6 and C5 specify respectively that I-BOUND is preceded by a STATE-phase and F-BOUND is followed by a STATE-phase. Combining information given by these constraints, Figure 2.8 (repeated here as Figure 2.16) can be reconstructed.



Figure 2.16: Event template for process expressions

Similarly, Figure 2.9 can be reconstructed by combining the following constraints: C6 + C1 + C2 + C4, reflecting the temporal relationship between the phases shown in the diagram.

Feature structures are simply a way of presenting information and in particular partial information. The fact that partial information can be represented is important when defining certain linguistic categories. Extensive use will be made of this in

the following chapters, where generalisations will be made about certain viewpoint aspects and aspectual verbs. For example, for the progressive aspect (see Chapter 3), a PROC-phase must be present in an event template, but it is underspecified with respect to the bounds (eg F-BOUND- or CULMIN-phase). Aspectual verbs (see Chapter 5) explicitly describe a certain event phase (eg, *start* explicitly describes the I-BOUND-phase), and the complement verb phrase associated with the aspectual verb must contain at least that phase. Partial information about the required event template can be given because, by the nature of the feature structure representation, partial information can be specified. The feature structure can combine with any feature structure which contains at least the same information, and maybe more. For example, *start* subcategorises for a verb phrase with an event template containing an I-BOUND-phase. However, implicit in that constraint is the occurrence of a PROC-phase in the template (by constraint C1). Therefore, with these constraints on temporal ordering separate from the feature structure representation, the value of EV-STR does not have to reflect a complete event template for a particular aspectual class.

In sections 2.5.1 and 2.5.2 I have shown how the event templates motivated in section 2.4 can be represented in a feature structure framework, in the spirit of the HPSG representation of Pollard and Sag (1994). This requires the introduction of a new feature—EV-STR—as a value of CONTENT. I show how this is incorporated in a feature structure for a complete verb phrase (eg *write* or *write a letter*), and then discuss the possible values of EV-STR (phases of the event) for each of the aspectual classes. The interpretation of the phases includes an interpretation of the temporal ordering of the phases to reflect the correct conceptual structure of events are language users perceive them.

In the next section, I shall illustrate the proposed representation of event templates with some examples from English and Russian.

## 2.5.3 Examples from English and Russian

Given the above details, I can now give examples of verbs in English and Russian to indicate how a non-finite verb can be represented as a feature structure. Finite verb phrases and sentences will be discussed in Chapter 3, after an interpretation for aspect has been given.

### 2.5.3.1 Examples from English

Taking as models the proposed representation of event templates from section 2.5.1.2, and the example for the culminated process expression *write*, in this section I shall show what the feature structure representation for verb phrases of other aspectual classes in English look like. Feature structures will be presented for the following verb:

(2.70) play process expression

(2.71) arrive culmination expression





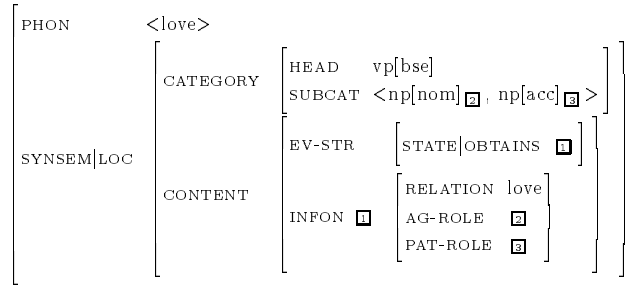


Figure 2.20: Feature structure for the verb *love*

same as for the English counterpart. English language labels are used to represent the semantic interpretation of, for example, the thematic roles and relations. Compare Figures 2.15 and 2.21.

Similarly for the representation of the Russian *prijti* ('arrive') and the English *arrive*. Compare Figures 2.18 and 2.22.

This equivalence of representation would be expected for the similar syntactic constructions dealt with here, but later (in section 3.5 of Chapter 3) it will be shown how the event structure of different syntactic constructions in the two languages is the same, allowing comparison of the semantic interpretation of viewpoint aspect in the two language; for example, the progressive in English is comparable with the imperfective in Russian, giving similar event structure referents, even though the English progressive is formed with the auxiliary *be* plus present participle while the Russian imperfective is marked in the morphology.

## 2.6 Conclusions

In this chapter I have discussed various ways of identifying event types referred to in natural language, reviewing different classifications and terminology. Those which provide a taxonomy of the internal structure of events are most appealing since they give a more detailed and fine-grained analysis of event reference, which is used in the following chapters in accounting for aspectual phenomena.

I have built on the approaches of Moens (1987) and Smith (1991), motivating a set of event templates, comprising a set of component event phases. These event phases are combined to reflect the internal event structure of each of the aspectual classes. Having focused on the English language, I turned to Russian and demonstrated that the event templates provide the appropriate structure to show the relationship between aspectual classes in that language. This suggests that the phases and templates motivated here have a general application across languages, at least

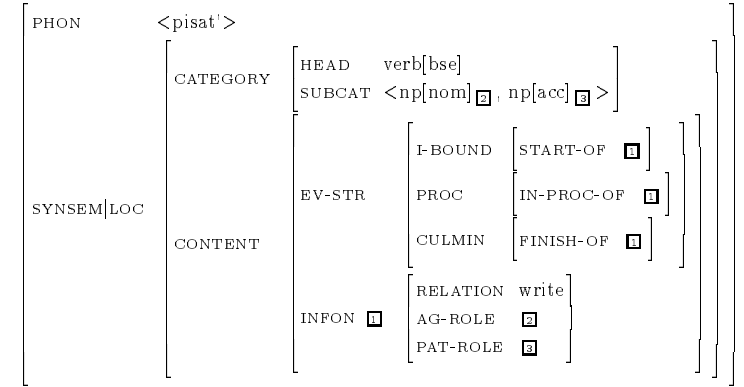


Figure 2.21: Feature structure for the verb *pisat'* 'write'

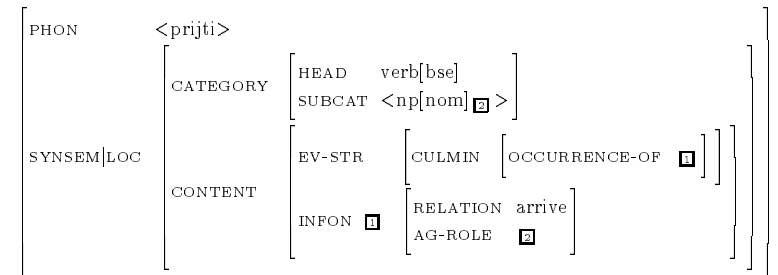


Figure 2.22: Feature structure for the culmination expression *prijti* 'arrive'

for the two Indo-European languages considered here. Smith's analysis of aspectual class in other languages suggests that the event templates motivated here could also be extended to other languages, and provides a basic representation of events as described in natural language for a large number of languages.

In the final section I provide a more formal representation of the event templates in terms of attributes in a feature structure framework. The event templates are represented by a feature, whose values reflect the component event phases. The combining and ordering of the phases is restricted by constraints. This representation will be developed in the following chapters.

## Chapter 3

# Viewpoint Aspect

### 3.1 Introduction

In Chapter 2 I motivated a set of aspectual classes used in natural language, and demonstrated how the structure of the events described by the classes can be represented in terms of event templates. Each sentence or clause has an associated event template which reflects the conceptual structure of the event *referred to* in that sentence. In this chapter, a distinction is drawn between the event template which is evoked and *referred to* by the sentence, and a part (or the whole) of the template which is *explicitly described* and is signalled by specific linguistic features in the sentence, such as aspect, aspectual verbs and temporal adverbials. The semantics of linguistic features such as aspect (or, to use Smith's terminology, viewpoint aspect) and aspectual verbs (discussed in Chapter 5) bring different parts of the referred-to event template into explicit 'focus'. I show how these two levels of representation can be reflected using the event templates motivated in Chapter 2, by extending the feature structure representation with a new feature.

As an example of the linguistic data, take the following sentences.

- (3.1)    a.    John wrote a letter. simple aspect  
           b.    John was writing a letter. progressive aspect

Both sentences are in the past tense, but (3.1a) has the simple aspect (traditionally called the simple past tense) and (3.1b) has the progressive aspect (often called the continuous). (3.1a) describes a completed *letter-writing*-event, whereas in (3.1b), the letter is not necessarily completed. These intuitions can be demonstrated with the following continuation sentences.

- (3.2)    a.    \*John wrote a letter, and didn't finish it.  
           b.    John was writing a letter, and didn't finish it.
- (3.3)    a.    John wrote a letter, and posted it at the corner shop.  
           b.    ??John was writing a letter, and posted it at the corner shop.  
                   (ie, the posting implying completion of the letter, which is not conveyed by the progressive)

*Write a letter* is a culminated process expression, and has an associated template consisting of the event phases I-BOUND, PROC, and CULMIN. The template is represented by the attribute EV-STR in the feature structures in Chapter 2. In section 3.5, a new attribute 'described' (DESCD) will be introduced which is co-indexed with certain of the values of EV-STR, to reflect those parts of the template which are *explicitly described* by the viewpoint aspect of the sentence. This distinction between referring to an event template and explicitly describing a part or all of it follows in the spirit of Glasbey (1994), whose situation theoretic account distinguishes between inferred and carried information. It also reflects the two components comprising Smith's theory of aspect.

In the case of (3.1a), the value of **DESCD** will be the same as the value of **EV-STR** (ie, the whole of the referred-to event is explicitly described by the simple aspect). For (3.1b), the completion of the event is not implied (compare examples 3.2b and 3.3b); therefore the **CULMIN**-phase is not explicitly described since the progressive aspect explicitly describes part of the **PROC**-phase. In this chapter I shall show how this interpretation can be represented in terms of feature structures and indicate how the analysis (where the value of **DESCD** is part of the **PROC**-phase) can be constructed from the syntactic structure of the sentence. This is achieved identifying what part of the sentence carries progressive aspect (in this case, the present participle suffix *-ing*).

These representations for the simple and progressive aspects will be compared with those for the perfect<sup>1</sup> in English and the Russian perfective and imperfective aspects.

(3.4) John had written the letter. perfect aspect

It will be argued that two levels of representation are necessary for the interpretation of aspect: the two levels being represented by the values of EV-STR and DESC. These two levels will be reflected in an extension of the proposed feature structures in section 3.5.

In this chapter I will review other approaches to accounting for aspect and aspectual class in natural language. In section 3.2, I present an overview of what features have traditionally been associated with aspect, and indicate how these features relate to the approach proposed here.

In section 3.3, I shall outline Smith's two-component theory for viewpoint aspect (Smith 1991), which forms the basis of the approach detailed in section 3.5. The spirit of Smith's two-component theory is very much in evidence in my approach, in that I offer two levels of representation reflecting aspectual class (Smith's situation aspect) and viewpoint aspect (the term used by Smith).

In section 3.4, I outline Moens' aspectual network, which manipulates the features of his tripartite event nucleus by means of transitions within the network. In this

<sup>1</sup>I treat the English perfect as an aspect. Traditionally, it is often considered to be a tense, although the fact that it carries aspectual properties is acknowledged. Compare Chapter 5 of Smith 1991.

section, I show that some of the transitions correspond to interpretations which are parallel to the viewpoint aspect interpretations given by Smith. However, others are related to other types of aspectual interpretations and these are discussed in section 3.6.

In section 3.5, I show how interpretations of viewpoint aspect can be given within the feature structure framework, corresponding to an HPSG representation. A correspondence is maintained in this analysis between the semantic interpretation of aspect and the syntax of the sentences. This is important (1) to demonstrate that the proposed event templates correspond directly to reference to events in natural language, and (2) to show the relationship between the syntactic and model-theoretic interpretation of aspect: at each level of the syntactic analysis, the corresponding semantic analysis is given, and as the phrases are built up to form a sentence, information from the constituent phrases is combined compositionally to form the interpretation for the complete sentence. The feature structures discussed in Chapter 2 are extended and the syntactic composition of sentences follows the HPSG formalism, allowing the relationship between this analysis and HPSG to be shown. I show how the semantic interpretation of aspect, in terms of event templates, can be incorporated with a syntactic analysis, and how HPSG provides a convenient medium for this. Analyses are given for both English and Russian, showing how the theory can be applied to both languages.

Returning again to Moens' aspectual network in section 3.6.1, I consider how the other types of transitions he identifies could be dealt with in the feature structure analysis. This leads into a discussion of how a general theory of aspect can be given, accounting for various types of aspectual reference.

### 3.2 Interpretations of aspect

The category of aspect has been identified in linguistics for many decades. Aspect is usually discussed in terms of the binary opposition **perfective** vs **imperfective**. Each of these categories carries a number of meanings, which are not unrelated but which make each of the categories appear to consist of sometimes contradictory features. In this section, I shall outline the main features associated with the perfective and imperfective aspects, and discuss how they relate to English and Russian. The aim of my analysis is to factor out the different roles that aspect can play in any given English or Russian sentence, and to provide a representation to reflect these roles. In this section, I therefore identify the components which are traditionally identified and indicate what part of my analysis they relate to.

Comrie (1976) provides detailed definitions of perfectivity and imperfectivity for various languages. Forsyth (1970) and Wade (1992) identify similar categories for the Russian language. Greenbaum and Quirk (1990) also provide a comprehensive descriptive overview of aspectual categories in English.

### 3.2.1 The perfective

The following features are identified by both Comrie (1976) and Forsyth (1970) as being associated with the perfective. ('Situation' is used to refer in general terms to an action, event or state, with no theoretical commitment.)

- to indicate a **completed action**  
(with emphasis on the end point)
- to indicate the **result** of a situation, ie, the successful completion of a situation
- to indicate **punctual, point-like** or **momentary** situations  
(this idea comes from the intuition that there is "no direct expression of the internal structure of a situation" Comrie, p. 16)
- to indicate situations of **short duration** (rather than situations of long duration)
- to indicate the **start** or "ingression" of an situation

The Russian perfective aspect can, for example, indicate a completed action with emphasis on the event itself, or it can indicate the result of an event with emphasis on the time following the event. The main interpretation of the perfective is as a completed event, with the result reading being implied by certain contextual information, such as the discourse context, or the use of certain adverbials such as *uzhe* ('already'). The Russian perfective is formed from the base form by a perfectivising prefix (in 3.5, this is *na-*), or a change in the root (eg, *konchat'* (IMP) vs *konchit'* (PERF), 'to finish'). The main feature of the perfective is completion, and the interpretation is underspecified with respect to emphasis on the event or the result of the event. Contextual information often indicates which of the interpretations is to be taken, with reading (i) in (3.5) being the preferred reading, and reading (ii) requiring specific contextual marking. Compared with the English simple aspect, there are two possible translations.

- (3.5) Ivan napisal pis'mo.  
Ivan wrote(PERF) letter  
(i) 'Ivan wrote the letter' or (ii) 'Ivan had written the letter'

Tests showing valid entailment relationships indicate that either reading is possible for the Russian perfective.

- (3.6) a. Ivan napisal pis'mo → Ivan konchil pisat' pis'mo  
Ivan wrote(PERF) letter → Ivan finished(PERF) writing letter  
'Ivan wrote the letter → finished writing the letter.'  
(completed event reading)
- b. Ivan napisal pis'mo → Ivan uzhe napisal pis'mo  
Ivan wrote(PERF) letter → Ivan already wrote(PERF) letter  
'Ivan wrote the letter → had already written the letter.'  
(result state reading)

In English, there are two perfective aspects: (1) the **simple**, which generally indicates a completed action and historically is often taken to be a tense form (eg, *John wrote the letter*), and (2) the **perfect**, which has both present and past tense forms (eg, *John has written the letter* and *John had written the letter* respectively). The perfect generally indicates the result of a situation, ie referring to a time following its completion. This can be tested by the following entailment relations:

- (3.7) a. John completed the letter → John had written the letter.  
b. John finished the letter → John had written the letter.

These aspectual interpretations can be represented in terms of the event templates introduced in Chapter 2, by focusing on a particular part of the template, and this analysis is developed in section 3.5.2.3. The interpretation of the Russian perfective aspect can have either a completed event reading, or the result state reading, depending on the context of the sentence it appears in. English has separate forms (simple and perfect) depending on what part of the event the speaker wants to focus on. In this sense, the Russian perfective is ambiguous between these two main interpretations, and the analysis in section 3.5.3.2 will reflect this. The completed event reading is the default reading, with the result state reading usually requiring some indication from the context. However, the result state reading is clearly available as a reading of the Russian perfective since, for example, it is felicitous with the adverbial marker *uzhe* ('already'). This gives an unambiguous interpretation of the perfective:

- (3.8) Ivan uzhe napisal pis'mo.  
Ivan already wrote(PERF) letter  
'Ivan had already written the letter.'

*Uzhe* ('already') indicates that the event is completed, and that the state immediately following the event is in focus, or is being explicitly described; this forces a reading which is equivalent to that for the English perfect.

While the English simple aspect only allows a completed event reading, the Russian perfective can have either this reading or the result state reading. I propose a representation which reflects this distinction between the languages in the semantics with the proviso that the result state reading for Russian requires further pragmatic support. Although the result state reading of the Russian perfective requires some contextual support (which would be represented as values of a feature PRAGMATICS), I argue that it is not inappropriate to give the semantic interpretation of this aspect as a disjunction reflecting the potential of the result state interpretation. This highlights the difference between the Russian perfective and the English simple aspects. Smith (1991) characterises the result state reading of the Russian perfective with a pragmatic convention in which the hearer understands that the result state of an event is in focus. She points out (p. 306) that this inference cannot always be made. This is reflected by my observation that the result state reading requires some additional pragmatic support. The net effect of both representations is the same,

but in my analysis the interpretation is made in the semantic domain. The main motivations for this are:

- the contrast between the English simple and the Russian perfective which is reflected in my analysis at the semantic level; and
- the availability of the result state reading for examples like (3.8); although this analysis requires some additional contextual marker, the semantic representation already offers the result state reading which means that the semantic representation is not contradicted when the result state reading is induced. This suggests that the pragmatics element of the feature structure should indicate which of the two interpretations should be made in any given discourse so that a choice is always made between the two, the completed event reading being classified as the ordinary default reading.

The following are examples of other features associated with the perfective.

- **momentary situations:** culminations in the perfective (in Russian) or simple aspect (in English) are the equivalent of momentary situations, for example:

(3.9) Vadim priehal.  
Vadim arrived-by-transport(PERF)  
'Vadim arrived.'

Here the aspectual class is important in conveying this sense of the perfective as a momentary situation; however, the event is also interpreted as completed by the perfective, therefore carrying two of the characteristics of the perfective.

- **start of a situation:** such expressions are usually culminations, which are perceived as instantaneous (as was argued in Chapter 2), but a related durative event is also inferred as continuing as a result of the occurrence of such an event. For example

(3.10) John burst into laughter

is a culmination expression with an event of laughing inferred as immediately following it. In Russian, a perfectivising prefix, such as *za-* often indicates the start of an event. For example

(3.11) On zagovoril ob otpuske.  
He start-talking(PERF) about holiday  
'He started talking about his holiday.'

Again, a durative event is inferred as following this event, and that event could be referred to by a process expression (using, for example, the verb *to talk*).

Both Comrie and Forsyth point out that sometimes these features listed above are incompatible with each other, and that in a given context the use of the perfective may reflect one or other of the features. The examples given demonstrate this. The main types of contextual influence are temporal adverbials, or aspectual class. If such features are taken into account, then just one of the interpretations of the perfective (or imperfective) is usually appropriate. By taking structure of events into account (by incorporating aspectual class into the analysis of aspect), it becomes clearer why, for example, the start of an event can be viewed as completed. Forsyth suggests that it requires a "somewhat tortuous logic to explain that here what is 'completed' is the beginning of the action" (Forsyth 1970: 2). However, considering the event template of a durative event with an initial bound marking the start of the event, this initial bound can, in turn, be viewed as an event in its own right (a culmination expression). This is exemplified in (3.10). In this chapter I give an account of aspect within the feature structure framework, showing how the same analysis can be applied to each of the event templates. In Chapter 5, I consider aspectual verbs in the same way, indicating how, for example, inceptives refer to the initial bound phase of a durative event, and but behave like culmination expressions. In this analysis the culmination expression can be viewed as a completed event in its own right, without making a commitment as to whether the rest of the event is complete. When aspectual class is taken into account, a strong case can be made to link culmination expressions (as events in their own right) with the initial (and final) bounds of durative events, and this allows for a straightforward analysis of aspectual verbs, which reflect this feature of the perfective aspect, without resorting to a "tortuous logic".

The traditional definitions of aspect attempt to give an all-encompassing statement of what aspect means, without considering context. The identification of aspectual class as being wholly distinct from aspect helps to unravel many of the problems, and this is why Smith's two-component theory (where the components comprise aspectual class and viewpoint aspect; see section 3.3) goes a long way in explaining aspectual behaviour.

### 3.2.2 The imperfective

Russian has an imperfective aspect which is conveyed by the morphology of the verb. For example,

(3.12) Ivan pisal pis'mo.  
Ivan wrote(IMP) letter  
'Ivan was writing the letter'

In English, the progressive aspect conveys the sense of an ongoing action, with explicit reference to the internal temporal structure. It is formed syntactically with the auxiliary *be* and the present participle. For example

(3.13) John was writing the letter.

The following features are identified by both Comrie (1976) and Forsyth (1970) as being associated with the imperfective. Like the characteristics of the perfective, one or more of the features given here may be associated with the imperfective in any given context. The context (eg, the presence of temporal adverbials) usually determines which reading is relevant. However, some of the readings are independent of each other and constitute different interpretations (eg iterative vs prospective). I shall mainly address issues concerning the imperfective referring to internal temporal structure of single events, rather than multiple events, which could be analysed, for example, as a series of single events forming a process type expression.

- explicit reference to **internal temporal structure** of a situation; viewing a situation from **within**
- to indicate situations of **long duration**
- in many languages there are no distinct categories to express the following meanings, and these are often expressed by the imperfective:
  - habitual
  - progressive
  - iterative
  - prospective

In terms of the event template introduced in Chapter 2, the internal temporal structure of a situation can be accounted for by identifying the internal part of the event template as being explicitly described, and this analysis will be developed in section 3.5.

The concept of an event being of long duration is a relative one. It implies a durative expression (ie, culminated process or process). However, durative expressions correspond to any kind of event in the real world, and the time scale of any event depends on knowledge about the event, eg sailing the Atlantic may take six weeks, while sailing the Channel may take only two hours. However, typically, the imperfective can be used to describe events of relatively long duration. In English for example culmination expressions are sometimes referred to with the progressive, and in this case the punctual event is portrayed as having duration for the purposes of the event representation, extending the perceived length of a punctual event. This is described in more detail in Chapter 4.

In Russian, certain perfectivising prefixes serve to indicate the length of duration, some referring to an event of comparatively long duration, eg *prostoyat'* ('to stand for a period of time'). Long duration is therefore not a feature exclusive to the imperfective.

The habitual and iterative are often considered to be process type expressions<sup>2</sup> and they could be represented in terms of a process or stative type template which

<sup>2</sup>Moens indicates a transition on his aspectual network (see section 3.4) which maps expressions through iteration to an (iterated) process expression.

refers to a period of time during which a series of events of the same type take place. In Russian these meanings are conveyed by the imperfective aspect; in English the simple aspect is often used, although the progressive may be used. For habitual readings there is also a separate construction: *used to do something*. Again, this is a feature not exclusive to the imperfective aspect, but in certain contexts this meaning is conveyed by the imperfective.

The prospective refers to the agent's intention to do something in the near future. In terms of event templates, it is the phase prior to the initial bound of the event which is explicitly described. The time span between this phase and the onset of the event is open to interpretation, and depends on context. In English, the progressive aspect is used to convey this meaning. The construction *to be about to do something* is also often used, although here the time span between the event happening (or potentially happening) and the reference time of the utterance is usually very short; in Russian the construction 'past participle + *bylo*' is used, distinguishing this reading from those expressed in the imperfective. Examples are as follows:

- (3.14) a. The plane was taking off at 3pm the next day.  
 b. The plane was about to take off when air traffic control ordered the plane to return to the terminal.
- (3.15) a. Samolet uletil bylo  
 aeroplane flew-off(PERF) it-was  
 'The aeroplane was about to take off.'

Comrie says that the two main interpretations of the imperfective are continuousness and habituality, which are usually treated as separate concepts in many grammars (Comrie 1976: 26). He suggests that this misses a generalisation about common features of these forms, suggested in part by the presence of a single category for both forms in many languages. He does not state exactly what the common feature is, but the fact that both have duration is probably the common feature. This thesis will not bring together an analysis of these interpretations, but is concerned with the contrasting interpretations of the perfective and imperfective aspect for references to single events.

### 3.3 Smith's two-component theory of aspect

#### 3.3.1 Aspectual class and viewpoint aspect

Smith's two-component theory of aspect demonstrates the relationship which holds between aspectual class (Smith uses the terminology situation type) and viewpoint aspect (Smith's terminology, which I use for clarity, and which is traditionally termed aspect). Aspectual class and the related event templates were discussed at length in Chapter 2. In this section I review Smith's approach to viewpoint aspect, and in section 3.5 a feature structure representation will be presented which employs many of the concepts of Smith's two-component theory.

The two-component theory provides a handle for dealing with viewpoint aspect for each of the aspectual classes. Smith draws an analogy between viewpoint aspect and the lens of a camera, where viewpoint aspect acts as the lens which can focus on any part of an event schema (her terminology), which I have developed as event templates in Chapter 2. The independence of viewpoint and aspectual class is essential to the two-component theory, and I carry this across in my analysis by representing aspectual class in terms of event templates (represented by the value of **EV-STR**) and viewpoint aspect by a new feature 'described' (**DESCD**), which picks out all or some of the components of **EV-STR**. In the feature structure representation this is achieved by re-entrancy.

Smith argues that in natural language there are three universal viewpoint aspects: imperfective, perfective and neutral, each of which "span all or part of a situation, or temporal schema" (Smith 1991: 93). The main contributions of the two-component theory are:

- the inclusion of the neutral viewpoint in the basic inventory of viewpoints, which is shown to be a default in many languages. It does not appear in English and Russian, the two main languages discussed in this thesis, so examples will only be given as appropriate.
- the extension of the range of the theory to languages "without grammaticalised viewpoints," with a claim that viewpoint aspect still functions as a linguistic category in these languages. For the languages under study here, there are clear morphological and syntactic realisations of the viewpoints, and these structures will be exemplified and analysed in this chapter.
- that viewpoint is independent of situation type (ie, aspectual class). This continues the tradition of considering aspect as an operator in many theories (for example Dowty 1979). However, Smith's theory spells out more explicitly the relationship between viewpoint aspect and aspectual class in terms of event schemata, providing a detailed ontology, unlike the progressive operator, which is represented simply as a function acting on an event reference.
- that the two-component theory allows a positive definition for each viewpoint on a semantic level, so that the traditional notion of "markedness" (eg the progressive as a marked aspect over the simple in English, or the perfective as the marked pair in Russian) is not manifested on the semantic level. So, for example, each viewpoint has its own semantic realisation: it focuses part of the event schema, in Smith's terms.

This explicit semantic representation of each of the aspectual forms makes it easier to show what semantic effects each has compared with the other; for example, the progressive vs simple vs perfect aspects in English can be compared with each other, instead of considering one as the marked form of the other. In my event template representation I identify common elements of the template

which particular viewpoint aspects explicitly describe (eg, the imperfective always explicitly describes part of a **PROC**-phase of the event template), and use this for a detailed comparison of the aspects.

Returning to the specifics of Smith's viewpoint aspects, the main semantic difference among them is how much of the temporal schema is made visible. The schema provides the basic structure (the first level of the two components) for viewpoint interpretation, and Smith's basic interpretations are as follows:

- **Perfective viewpoints** include both endpoints of a situation, ie the whole of the situation is spanned, and this is indicated by hatched marks in Smith's schemata (see Figure 3.1a), which corresponds to the identification of particular parts of my event templates which are marked as being 'explicitly described' in the feature structure representation; re-entrancy allows cross-referencing between the values of **EV-STR** and a new feature described (**DESCD**). See Figure 3.2a where all the values of **EV-STR** are token identical with the value of **DESCD**, ie the whole of the event is described and it is therefore complete.
  - **Imperfective viewpoints** focus on stages that are neither initial or final, ie the endpoints are excluded. In Smith's account, this means that any of the three stages before the initial endpoint, after the final endpoint or between these two endpoints could be focused (see Figures 3.1b–d). Some of these interpretations are "marked" forms (see Figure 3.1c–d) resulting from shifted forms. I attempt to provide a more uniform account of at least the basic interpretation<sup>3</sup> of the imperfective by suggesting that it is only the stages between the two endpoints which can be focused, that is (in my terms) only part of the **PROC**-phase of the event template can be explicitly described (by the **DESCD** feature). See Figure 3.2b where part of the **PROC**-phase is indicated by the value of the event phase **PROC** being token identical with the value of **DESCD**. The other event phases corresponding to a durative are not explicitly described feature in the representation. They are not given in Figure 3.2b, but can be inferred by constraints C1, C2 and C3 (section 2.5.2, see page 56).
- This interpretation of the imperfective depends on the motivation for the event templates, and constraints on their ordering, discussed in Chapter 2.
- **Neutral viewpoints** include the initial endpoint and at least one stage of a situation (following the initial endpoint), but this is not a category relevant for either English or Russian, and is therefore not discussed in this thesis.

Smith proposes these three viewpoint aspects as universal categories claiming that all sentences in natural language carry a viewpoint. Neutral viewpoint is the default for those sentences without an explicit aspectual marker, but since English and Russian both have explicit aspectual markers in each sentence, a test of this

<sup>3</sup>Leaving, for example, the prospective or futurate interpretation of the English progressive aside, eg *John was travelling to Spain* meaning *John was going to/intending to travel to Spain*

a. Schema for the perfective (p. 103)

I ..... F  
 //////////////////////////////////

b. Schema for the imperfective (p. 111)

I ...////////... F

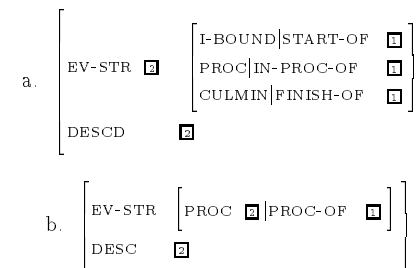
c. Schema for ‘marked’ resultative imperfective (p. 116)

I ..... F   ////////

d. Schema for ‘marked’ imperfective, focusing on  
 ‘preliminary external stages of a situation’ for  
 English progressive (p. 225)

//////// I ..... F

Figure 3.1: Smith's schemata for perfective and imperfective aspects



where in each case  $\boxed{x}$  is token identical with the values of INFON for the event referred to.

Figure 3.2: Feature structures for perfective and imperfective aspects

claim cannot be made. What will be questioned is how these universal categories of perfective and imperfective viewpoint aspect relate to the language specific aspectual forms in English and Russian.

For example, the Russian perfective refers to a completed event including both endpoints of the schema. However, the Russian perfective also has a reading like the English perfect in which the time following the completion of the event has current relevance. I shall suggest that the Russian perfective can also explicitly describe (by the feature DESC) the phase following the final bound of a given template. This will be discussed in section 3.5.3.2.

Smith points out that the availability of viewpoint aspects differs amongst languages. In some languages all viewpoints are available to all situation types (for example, French), in others one viewpoint may have limited distribution, eg the availability of the imperfective and progressive for culminations in Russian and English respectively. A Russian culmination expression in the perfective form does not always have an imperfective counterpart. For example, *zamolchat* ('to start to be quiet') does not have an imperfective counterpart although *zapet'/zapevat* ('to start singing') does.

Smith also mentions that viewpoint aspect is generally expressed by a morpheme or syntactic structure associated with the main verb of a sentence. For example, the Russian perfective is usually marked by a prefix and the un-prefixed counterpart corresponds to the imperfective; the English progressive is formed with the auxiliary *be* plus present participle. In section 3.5, I show how a compositional interpretation can be given in a feature structure style representation by identifying the aspectual contribution of each of these morphemes and auxiliaries.



### 3.3.2 The imperfective paradox

The imperfective paradox is a fundamental issue for any theory of aspect. It is concerned with the apparent paradox in a sentence such as (3.16a), in which both a circle and a *drawing-of-circle-event* are referred to, but the interpretation of the sentence is such that neither of these entities are necessarily realised. The imperfective describes the process of realising these entities. Therefore, (3.16b) cannot be inferred from (3.16a). The issue is what kind of semantics examples like (3.16a) should have.

- (3.16) a. Mary was drawing a circle.  
b. Mary drew a circle.

Because the conceptual status of an event can be represented (aspectual class) at a different level from that part which is explicitly described (representing viewpoint aspect), Smith argues that an adequate account is given for this paradox. There are two “levels of knowledge” about the event: the knowledge that an event type is evoked in the representation at one level, and the knowledge that at least part of that event is realised in the real world (because it is explicitly described at a different level). Smith does not give a logical interpretation of the relationship between these two components, and it is therefore unclear exactly what the status of the “unfinished” event is, but, as she points out “people categorise events without full, conclusive evidence [of the eventual outcome]” (Smith 1991: 96), so it seems reasonable to have a level of representation which reflects the concept of an event type, the token of which is not necessarily realised in the given situation.

I also do not take the analysis any further, but argue that feature structure representation is adequate for my purposes in showing the relationship between these two levels of representation. The representation allows comparisons to be drawn between the interpretation of the imperfective aspect in Russian and the progressive aspect in English, and I show that these language specific categories represent the same information because the feature structure representation is the same for each sentence in each of the languages.

There have been many attempts to account for the imperfective paradox in various logical frameworks in the literature. Dowty (1979), Lascarides (1988), Asher (1992), Landman (1992), Glasbey (in press) have, for example, proposed interpretations of imperfective constructions within their respective frameworks. I take the analysis of the imperfective paradox only to the stage where a relationship is shown between the event template and the part which is explicitly described. A fuller account would require a logical interpretation of the values of the feature structures showing how the two components relate to realisations (or potential realisations) of events in the real world. This issue is beyond the scope of the thesis, since I am concerned with the comparison of aspectual interpretation in Russian and English rather than with a specific account of the imperfective paradox. I demonstrate that the progressive in English and imperfective in Russian are both interpreted (in certain contexts) within a feature structure framework as explicitly describing part of the process phase of the event template, thus showing that their interpretations in those contexts are the same.

### 3.3.3 The extent of the viewpoint span

From the range of viewpoints in language, Smith claims that certain viewpoints span periods which go beyond the bounds of the situation referred to, ie what is explicitly described does not necessarily include the event template at all. One type of viewpoint focuses on the preliminary stages of an event (eg the imperfective of achievements or culminations). One type involves a resultative, which Smith also calls an imperfective and focuses the period after the event has taken place (eg *Maria is lying on the bed*, *Maria is sitting on the chair*, following, respectively, a *lying-down-event* and a *sitting-down-event*).

Smith’s analysis therefore allows the imperfective viewpoint to focus any part of the schema which has a temporal extent (ie not the endpoints), depending on the context.

This is one of the main points of departure between my account and Smith’s. I argue that the period before the initial bound of the template cannot be explicitly described by the imperfective, in its sense of describing an event in progress. Smith accounts for achievements in the progressive as a marked imperfective which focuses on the time span before the point marking the achievement. I argue in Chapter 4 that achievements or culminations have internal structure and that the time before the event’s occurrence is reserved for other constructions which do not require the event to actually take place, such as *to be about + infinitive*, for example *John was about to write the letter to his aunt*.

I therefore draw a distinction between description of the event itself (by explicitly describing part of the event template) and futurate and prospective constructions, which refer to the intention or potential of an event in the future. For example, the futurate progressive in English (*to be doing something* meaning *to be going to/to intend to do something*), and the construction *to be about + infinitive*.

- (3.17) a. John was going to fly out on Monday morning.  
b. John was flying out on Monday morning. (intention to fly out then)  
c. John was about to fly out. (immediate proximity to the event)

In Smith’s analysis, resultative constructions focus on a period after the final endpoint. Smith gives examples from both English and Chinese:

- (3.18) Mary was lying on the bed. (Smith 1991: 97)  
(3.19) John was sitting in the chair. (Smith 1991: 116)  
(3.20) Zhangsan zai chuang shang tang-zhe.  
Zhangsan at bed on lie-ZHE  
'Zhangsan is lying on the bed.' (Smith 1991: 115)

In English, *to lie on the bed* is a process expression<sup>4</sup>, as opposed to the culmination expression *to lie down on the bed*. There is an inferred relationship between these two expressions: an event of lying down refers to the start of a *lying-on-the-bed*-event. If *to lie on the bed* is a process expression, it has a related event template (with phases I-BOUND, PROC and F-BOUND) and the progressive in (3.18) therefore explicitly describes part of the PROC-phase, and does not need to be accounted for as a 'marked' imperfective resultative construction, as Smith suggests. An inference can also be drawn from world knowledge that this phase refers to the result of someone lying down on the bed (described by the following sentence: *She has lain down on the bed*). In section 4.4 I discuss how inferences can be drawn between related events, and indicate how such inferences might be dealt with in the feature structure representation. Such an analysis could be extended for the kinds of examples discussed in this section. In a full analysis, contextual information would be required to identify which inferences are valid.

Like English, Russian also distinguishes between events like *to lie* with different forms of the verb for the event involving movement—*lozhit'sya/lech'* ('to lie down')—and the more static event of being in place—*(po)lezhat'* ('to be lying'). Again, the relationship between these events can be made by way of inferencing.

### 3.3.4 The perfect in English

Smith deals with the English perfect as a tense with "aspectual values", and discusses this construction in her chapter on temporal location (Smith 1991: 243ff). The perfect construction carries significant aspectual features, and is often accounted for as a type of viewpoint aspect, describing a period of time following the referred-to event.

Smith outlines various characteristics of the perfect. She states that perfect sentences locate a situation prior to the reference time of a sentence (presumably alluding to Reichenbach's Reference Time, where  $ET < RT$ ). So, the reference time (corresponding to the value of my feature DESC<sub>D</sub>) identifies a time following the occurrence of the event referred to, implying a complete event. Reichenbach (1947) identifies the event simply as Event Time, but this corresponds to the event template (value of EV-STR), which not only refers to the event itself (which takes place at a particular time), but also includes information about its internal make-up, thus allowing a distinction to be made between events of different aspectual class. Reichenbach's ET and RT are defined as points, while the references introduced here correspond to entities with internal structure, which often have temporal duration. This is in line with Hinrichs (1986) who interprets reference time and event time as having temporal duration, allowing inclusion and overlap relations. He also indicates that events are "intervals of time that are undetermined with respect to their length" (Hinrichs (1986): 65), and this reflects a vagueness in the timescale of events.

<sup>4</sup>Tests: *Mary lay/was lying on the bed for 2 hours*; *\*Mary lay on the bed in 2 hours*; *Mary stopped lying on the bed*; *?Mary finished lying on the bed*.

The English perfect construction comprises the auxiliary *have* plus a past participle. Smith also references the Chinese perfect construction, *guo*, which also focuses a period follow the event.

Examples of the English perfect are given:

- |        |                         |                 |
|--------|-------------------------|-----------------|
| (3.21) | John has arrived.       | present perfect |
| (3.22) | John had arrived.       | past perfect    |
| (3.23) | John will have arrived. | future perfect  |

Another feature of perfects which Smith notes is that they have a stative value: "they present a state of affairs with characteristics due to the prior situation" (Smith 1991: 146), where the state of affairs is considered as a state. This is true in that the situation after an event is an unrestricted duration, reflecting the characteristics of states. Often the perfect is defined as describing a state following an event, but in a context where there is still "current relevance to the discourse". This implies that the state does not extend indefinitely in time after the event, but is bounded by pragmatic factors determining the nature of the "current relevance" (Quirk et al. 1985). So, over and above Smith's treatment which identifies a state following the event for the perfect, I shall consider other defining factors of this state. Moens (1987) identifies, for example, a consequent state which follows certain events, and it is implied that this consequent state extends indefinitely. However, in the literature, the possible temporal extent of consequent states is discussed (for example, Sandström 1993), and pragmatic factors are identified which give more content to the concept of consequent state. The consequent state appears to be related to a pragmatic notion of "current relevance to the discourse context", and by this kind of definition the temporal extent of a consequent state may vary from event to event and context to context. The consequent state phase would always temporally follow a culmination phase of the event structure, and for this reason the completion of the referred-to event is entailed.

In my analysis I take the interpretation of the perfect aspect as explicitly describing the consequent state phase of the event template. Following Moens, I restrict the reference of the perfect to event templates which include a CULMIN-phase. By constraint C4 (page 57) the CULMIN-phase is followed by a consequent state phase (CONSEQU-STA-phase). This reflects Smith's observation that the perfect has a stative value, but the aspectual interpretation is also present in that the consequent state phase, by definition, is preceded by an event of aspectual class culmination or culminated process.

Further interpretation of the temporal extent of the consequent state phase would be needed to account for pragmatic factors such as "current relevance", and before turning to a discussion on Moens' aspectual network, I shall indicate the type of contexts for which pragmatic features could be invoked in a feature structure representation. These would be features dependent on discourse or intersentential factors. The analysis presented here focuses on sentence-level interpretation, and a discourse

based account would require additional features for pragmatics corresponding to the types of context discussed here.

Although the consequent state phase always occurs after the event it refers to (since it entails the completion of the event as indicated by constraint C4), the phase does not necessarily continue indefinitely, and can be reactivated at a later time if pragmatic context allows. The notion of “current relevance” has been used extensively in descriptive linguistics to indicate the circumstances under which the English perfect is felicitous. Moens formalises this constraint with the notion of the consequent state, restricting its application to sentences of aspectual class culmination and culminated process with the observation that these are the two aspectual classes which are felicitous with the English perfect.

In the analysis which follows I take Moens' interpretation of consequent state and give an interpretation of the CONSEQU-STA-phase in terms of event templates. In this section I shall briefly outline the kinds of discourse context which specifically make this phase available for reference. This kind of context could be built into a discourse based analysis of temporal phenomena, and be analysed in terms of pragmatic constraints which appear as feature values.

Sandström (1993) gives a detailed discussion of the types of discourse relations which make up the concept of consequent state and I briefly outline these here.

- prearrangedness: Sandström argues that the perfect can be used with reference to a point event if a change of state is established by the nature of the discourse context.

(3.24) ? *John has hiccupped.*

(3.24) is usually considered to be anomalous, but if we decide that Harry is to wait for John's hiccup before he carries out, say, the robbery in the bank, then a discourse like the following is acceptable:

(3.25) “John and Harry walk into the bank. Harry approached the cashier and held him at gunpoint. John had hiccupped which was his signal to Harry to launch the raid.”

Such a prearrangement would have to be established from the discourse context before it could be encoded in a feature structure representation.

- enablement: The occurrence of one event makes another event possible by providing the appropriate conditions

(3.26) a. When she had reached him she whispered into his ear.  
b. When she had stood up again after the fall she looked around for the others.

- current relevance: the consequent state phase can be re-invoked at a later time if the discourse context allows. For example, in the following discourse.

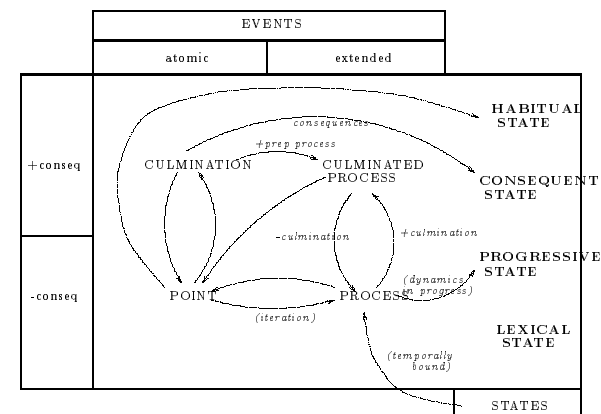


Figure 3.3: A diagram of Moens' aspectual network

(3.27) “I went to Florence last week”.  
“Really. I've been to Florence, but that was ten years ago.”

These are types of contexts which support a consequent state relation following a culmination phase. Features related to these relations could be invoked as values of PRAGMATICS in a more detailed discourse based analysis which would substantiate reference to the CONSEQU-STA-phase.

### 3.4 Moens' aspectual network

In Chapter 2, I argued for a representation of aspectual class in terms of event templates, and used Moens' tripartite event nucleus as a basis for developing the templates. In this chapter, the focus of discussion is the interpretation of aspect (viewpoint aspect), which will be given using event templates as the basis for this interpretation. However, it will be a separate component from the representation of aspectual class, in the spirit of Smith (1991). In Moens' thesis, his aim is to provide a unified treatment of aspect, which he sees as breaking with traditional approaches: “such a unified treatment of tense, aspect and Aktionsart [ie, aspectual class] may seem in sharp contrast with traditional account in the area of temporal reference, where these categories are treated as clearly separate” (Moens 1987: 38), and his main contribution is to demonstrate the interaction between these different kinds of aspectual phenomena within a single framework. To this end he motivates an aspectual network consisting of various aspectual categories based on variations of the tripartite event nucleus. Transitions between these categories are specified, and

restricted to those permitted by linguistic context (eg, a particular temporal adverbial, a particular aspectual form, etc) and extra-linguistic knowledge (eg, about the nature of an event, such as *work in the garden*). *Work in the garden* may be considered as a process expression in most contexts, but a culminated process expression in others if there's an intention to, say, dig a particular patch over before tea: *I've finished working in the garden for today; the rose-bed is prepared for planting now.* Transitions are indicated by arcs in the aspectual network, which is reproduced in Figure 3.3.

The transitions are defined as functions which map from the basic aspectual class of a phrase to a new class, influenced by the context, eg [+ culmination] changes a process expression into a culminated process expression, indicating the differences in aspectual class for the phrases *John ran* and *John ran to the station*. This transition is marked by the arc [+ culmination] between PROCESS and CULMINATED PROCESS in Figure 3.3, and is also given in (3.29).

Moens defines the basic aspectual class of a phrase as a verb in the simple past with a singular subject noun phrase and, for transitive verbs, a singular object noun phrase. Diagnostic tests with temporal adverbials, similar to those presented in Chapter 2, are used to determine the class of such propositions. Transitions then act as functions altering the class of the derived proposition. In the above example, *John ran* behaves typically as a process expression, and the addition of the culmination point indicated by *to the station* corresponds to the arc [+ culmination]. *Write* is usually a transitive verb, and so an expression such as *John wrote the letter* is used to determine the base class of *write* as a culminated process expression. *John wrote letters* is coerced into an iterated process expression via the transitions CULMINATED PROCESS to POINT, indicating the event as an unanalysed unit before being coerced as an iteration from POINT to (iterated) PROCESS.

I do not give a detailed analysis of aspectual composition of the verb phrase, but focus on the interpretation for viewpoint aspect, which is extended to account for aspectual verbs. I therefore assume the aspectual class of a verb phrase of sentence is established. See Verkuyl (1972), Krifka (1992) for proposed treatments at this level of interpretation. Some of Moens' coercions correspond to the aspectual composition of the verb phrase, and others can be identified as corresponding to the interpretation of viewpoint aspect outlined in the remainder of this chapter. For example, *John was writing the letter* is derived from the basic proposition *John wrote the letter*. The base class is culminated process, which is coerced into a PROCESS by the 'stripping away' the culmination point, and then into a PROGRESSIVE STATE, producing the sentence in the progressive viewpoint aspect (ie, *John was writing the letter*).

Such transitions correspond to the analysis given by Smith whereby a part of her temporal schema is focused by the application of, say, the imperfective viewpoint. Another example is the transition from CULMINATION to CONSEQUENT STATE, which indicates a relationship between the culmination expression *John arrived* and the perfect aspect *John had arrived* (see example 3.28).

In section 3.5, I shall show how a treatment of such examples can be given in terms of the feature structure representation, where the progressive aspect and

English and imperfective aspect in Russian are identified from their syntactic form, providing a compositional analysis constructed from the syntactic components of the sentence. This contrasts with Moens' analysis, which requires a model-theoretic interpretation separate from the syntactic composition of a sentence. The analysis of the viewpoint aspects in English and Russian effectively provides an account of two of the transitions in Moens' network (the two given in 3.28), corresponding to imperfective and perfective viewpoints in Smith's analysis.

Moens' unified treatment of aspect does, however, identify other aspectual transitions, and these can be categorised into various types, detailed in (3.28)–(3.30). These will be discussed in detail in section 3.6.1, where suggestions will be made as to how they—and other aspectual phenomena such as aspectual verbs—can be treated in the same spirit as viewpoint aspect. In the next section (section 3.5), I show how viewpoint aspect can be analysed in a framework where parts of the event template are explicitly described by the feature DESC.

- (3.28) Two coercions corresponding to 'viewpoint' aspect (eg, progressive, perfect aspect in English; imperfective, perfective in Russian)  
 (a) Corresponding to the progressive:  
 eg, *John wrote the letter* vs *John was writing the letter*  
 transitions:

-culmination  
 culminated -----> process -----> progressive  
 process state

- (b) Corresponding to the perfect:  
 eg, *John arrived* vs *John had arrived*  
 transition:

(consequences)  
 culmination -----> consequent state

- (3.29) Coercion corresponding to changing event reference within the sentence, eg the presence of certain prepositional phrases which affect the aspectual class of a sentence  
 eg, *John ran (in the park)* vs *John ran to the station*  
 transition:

+culmination  
 process -----> culminated process

- (3.30) Coercion corresponding to iterating references to events  
 eg, *John arrived at 2pm* vs *Every day John arrived at 2pm*  
 eg, *John wrote a letter* vs *John wrote letters* transitions:<sup>5</sup>

```

      culmination    >---\
culm'ed process    >--- ---> point -----> process
      process      >---/          (iteration)

```

### 3.5 Event templates and viewpoint aspect

In this section, I show how a unified approach to aspect can be developed in the feature structure framework introduced in section 2.4 of Chapter 2, by incorporating the interpretations of viewpoint aspect which Smith gives in her two-component theory (Smith 1991). I shall then return to Moens' approach to aspectual interpretation and show how the permissible transitions from his aspectual network are reflected in interpretations I give.

In section 2.5 of Chapter 2, the feature structure representation of aspectual class (which I represented in terms of event templates and event phases) were interpretations which did not include tense and aspect. In this section I shall show how aspect can be incorporated into the representation, and how this representation is derived from the syntax of the examples.

In section 3.5.2, I shall show how the representations for *wrote* (simple aspect; past tense) and *was writing a letter* (progressive aspect; past tense) can be derived from the base form of the verb *write*, which was given a feature structure interpretation in section 2.5.1. In HPSG lexical rules are used to derive lexical entries of inflected or compound words from base entries, and these will be introduced to derive the inflected forms *wrote* and *writing*. The rules indicate what changes are made on a morphological, syntactic and semantic level. For example, the present participle *writing* is formed from *write* by adding the suffix *-ing* (and dropping the *-e*). This is represented as a function in the rule, which would be dealt with by morphological rules in a fuller account. Semantically, the present participle carries information about aspect, and this information is indicated in the lexical rule by introducing the feature *DESCD*, mentioned in previous sections. Similar lexical rules are given for the Russian perfective and imperfective aspects in section 3.5.3, and while some of the semantic changes are the same, the function producing the new morphology is obviously different. This allows comparisons to be drawn between aspectual interpretations in the two languages.

I take the event templates introduced in Chapter 2 as the basic underlying conceptual representation of the aspectual class of the verb phrase or sentence. The values of *EV-STR*, comprising event phases, remain unchanged in the representation

<sup>5</sup>Note that such iterated processes can also be coerced further, to become culminated processes, accounting for examples such as *John wrote three letters/some letters*. Thanks to Sheila Glasbey for pointing out this example.

once the template is established. In section 3.4, I explained how the aspectual class of a verb phrase can differ from the base form, depending on syntactic context. Since I do not give a detailed analysis of aspectual composition of the verb phrase, I assume that the aspectual class of a verb phrase of sentence is already established, and this will be reflected in the values of *EV-STR*. *DESCD* represents the interpretation of viewpoint aspect, and is token identical with some or all of the values of *EV-STR*, and this corresponds to the hatched part of the temporal schema in Smith's approach (see Figure 3.1 on page 75). Since values of *EV-STR* remain, and part or all of them are described by the feature *DESCD*, the relationship between the kind of event referred to and that part which is explicitly described is clearly shown in the representation. This corresponds to the two levels of Smith's analysis, but differs from Moens, who does not distinguish between these two levels. If, for example, only a part of the process phase of, say, a process expression is explicitly described, the beginning and ending of that event—which is part of a language user's understanding of a process expression—still appear in the representation.

In my feature structure representation, reference to particular parts of the event templates is more explicit than in Smith's account since the value of *DESCD* is cross referenced with the relevant event phases represented as feature values of *EV-STR*. In this way, the reference of viewpoint aspect can be restricted to certain of the event phases. The analysis of aspectual verbs in Chapter 5 will follow along the same lines. For example, in the main interpretation of the progressive in English and imperfective in Russian (the single event interpretation), both explicitly describe part of a *PROC*-phase of a template. The feature structure representation provides an appropriate medium for this type of representation, where the progressive and imperfective aspects can be represented as was shown in Figure 3.2 on page 76. Given the event phases motivated in Chapter 2 and the representation presented in this section, viewpoint aspect and aspectual verbs can be treated in a similar and straightforward way, and generalisations can be made about how they explicitly describe certain parts of the templates.

In section 3.5.2 and section 3.5.3, I shall show how the feature *DESCD* is incorporated into the HPSG representation by way of lexical rules which derive the verb form carrying aspect from its base form. In this way, viewpoint aspect is built into the representation.

#### 3.5.1 An outline of the HPSG analysis

The syntactic and semantic interpretations of phrases are made by combining the lexical items according to constraints, which must be satisfied for the phrase or sentence to be well-formed. In HPSG, certain principles are proposed (such as the Subcategorization Principle, the Head Feature Principle and the Semantics Principle), which indicate what information is carried from one phrase to another. The Head Feature Principle (HFP), for example, specifies that the "HEAD value of any headed phrase is structure-shared with the HEAD value of the head daughter" (Pollard and Sag 1994: 34), which ensures that headed phrases carry the same syntactic values as their head daughters. In Figure 3.4 *arrived* is the head daughter of the

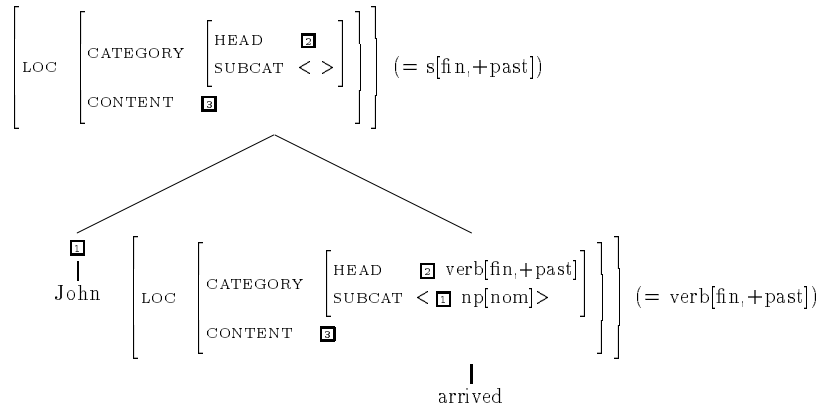


Figure 3.4: Tree for *John arrive*. In brackets are abbreviated forms for the signs, ie,  $s[fin,+past]$  and  $verb[fin,+past]$ .

sentence node (abbreviated  $s[fin,+past]$ ), and its value of **HEAD** is structure shared with the value of **HEAD** of the sentence phrase. [+past] indicates the past tense, and is given as a boolean value of **HEAD**.<sup>6</sup> The Subcategorization Principle indicates that “in a headed phrase, the **SUBCAT** value of the head daughter is the concatenation of the phrase’s **SUBCAT** list with the list of **SYNSEM** values of the complement daughters” (Pollard and Sag 1994: 34). In my example, this indicates that the **SYNSEM** values of the phrase representing *John* (the complement daughter) must be token identical with one of the values (here there is only one) on the **SUBCAT**-list of *arrive* in order to produce a well-formed sentence phrase. Since *John* can be interpreted as a nominative noun phrase, this constraint holds.

The representations of sentences given in the rest of the thesis will be presented in terms of feature structures similar to this example, and all the examples will follow the principles just outlined. These representations give an impression of how aspectual interpretation could be analysed in terms of an HPSG formalism, although I do not specify a complete fragment in the thesis. The syntactic interpretations are standard, and the aim of the following representations is to show how information about event structure and explicitly described entities can be incorporated into a

<sup>6</sup>[–past] indicates the non-past. I shall only consider examples in the past tense in this thesis, and do not give an explicit interpretation of tense. However, the value of [+past] would require an interpretation, which could correspond to Reichenbach’s treatment of tense (Reichenbach 1947). As has been outlined before, the feature **EV-STR** corresponds to his event time (ET), and the feature **DESCD** would correspond to his reference time (RT). Past tense could be interpreted as indicating that reference time is prior to a pragmatically determined speech time (ST).

feature structure framework. Given the analyses developed in the following chapters, it is reasonably easy to see how an HPSG implementation could be made. However, I focus on the kinds of semantic representations needed to account for the aspectual data, rather than giving a full implementation in HPSG. Certain simplifications have been made; for example, the feature structures have not been typed as they are in Pollard and Sag (1994). Also, the semantics component of the analysis (values of **CONTENT**) is restricted to information about (1) **EV-STR**, (2) **DESCD** and (3) **INFON**, representing respectively the referred-to event, the part which is explicitly described, and reference to the semantic make-up of the event. By a simplified version of Pollard and Sag’s Semantics Principles, the **CONTENT** value is token-identical with that of the semantic head. In Figure 3.4 *arrived* is the head daughter of the sentence, and so the **CONTENT** value of this phrase is structure shared with that of the mother phrase. This is indicated by  $\square$ .

The tree representations are therefore constructed in the spirit of an HPSG analysis in order to indicate how the semantic interpretations of aspect can be incorporated with the syntactic interpretations of phrases in HPSG. The Principles outlined above are combined in the HPSG analysis by the Immediate Dominance Principle (IDP), which specifies the available options for well-formed phrases. These options are represented as schemata which constrain the nature of well-formed phrases. The interpretations following all comply with either Schema 1 or Schema 2, which are based on the HFP and Subcategorization Principle (Pollard and Sag 1994: 38).

### 3.5.2 Feature structures for English viewpoint aspect

Building on the representation for *write* (Figure 2.15, repeated here as Figure 3.5) developed in section 2.4, I show how it is possible to incorporate the representation of viewpoint aspect (the feature **DESCD**) in this representation.

In this section, the simple, progressive and perfect aspects will be discussed, developing feature structure representations for the examples in (3.31), all of which are in the past tense.

- (3.31) a. John wrote the letter. (simple aspect)  
b. John was writing the letter. (progressive aspect)  
c. John had written the letter. (perfect aspect)

In the feature structure for the verb *write* (Figure 3.5) the base form of the verb is not marked for tense or aspect. Tense and aspect in English is marked by auxiliaries, suffixes and participles in examples (3.31a)–(3.31c). In (3.31a), the simple aspect and past tense is marked by the simple past suffix *-ed*, which is derived in HPSG from the base form of the verb (eg, *write*) by a lexical rule (Figure 3.6). The morphology of *write* is irregular, producing *wrote*; compare *walk* and *-ed* forming *walked*. The progressive aspect is carried by the present participle (eg, *writing*), and this form is also derived by a lexical rule (Figure 3.9). Sentences in the progressive aspect in English are formed with the auxiliary verb *be*, which in its finite forms carries tense.

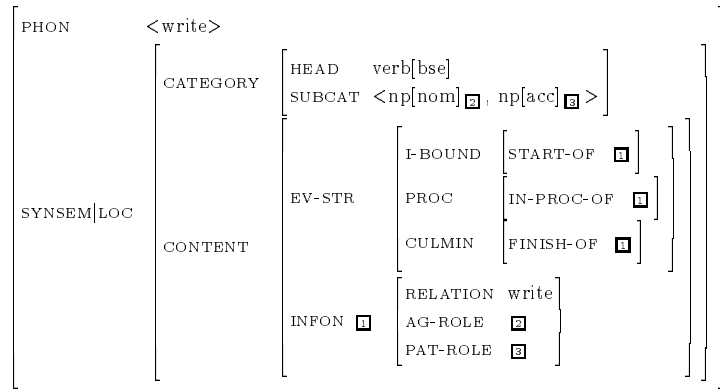


Figure 3.5: Feature structure for the verb *write*. As a transitive verb *write* is a culminated process expression, and therefore EV-STR have the values I-BOUND, PROC and *culmin*.

Similarly, the perfect aspect in English is carried by the past participle, also formed from the base form by a lexical rule.

In the feature structure representation, aspect is expressed by the value of DESC, which marks certain values of EV-STR, and as was just mentioned, tense is marked as a value of HEAD. In this section lexical rules are presented to derive the aspectual interpretation, and I then show how the syntactic and semantic interpretation is made for complete sentences.

### 3.5.2.1 The simple aspect

The simple past in English is formed by the lexical rule, shown in Figure 3.6. Lexical rules derive inflected forms from base lexical entries in HPSG, prior to application of the Immediate Dominance Principle. They preserve all properties of the input which are not mentioned in the rule, so only the information which changes is mentioned in the rules given here. A suffix function relates the base form of the verb (indicated by the index 1) and the simple past suffix *-ed*, forming for example *played* from *play*, and (by-passing details of morphology, in which irregular forms are determined by details of the function) *wrote* from *write*. The lexical rule is a rewrite rule, and the value of HEAD|VFORM becomes *fin* rather than *bse*, and a value for PAST is specified as [PAST +]. The base form carried values for EV-STR, which remain unchanged and indicate the aspectual class of the base form. Taking the example of *write*, these are given in Figure 3.5. For the simple past, the values of EV-STR are token identical with the values of DESC, indicating that the whole of

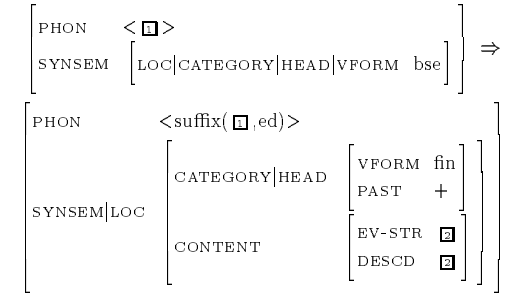


Figure 3.6: Lexical rule to derive the simple past form from the base form of a verb

the event reference is explicitly described when the simple past is used. That the event is completed can be inferred from the fact that the whole of the event reference is explicitly described. This contrasts with the interpretation of the imperfective aspect (the progressive in English) where only part of the PROC-phase is co-indexed with the value of DESC (see section 3.5.2.2).

Applying the lexical rule from Figure 3.6 to the base form of *write* (Figure 3.5) yields the sign for *wrote*, shown in Figure 3.7.

The syntax of *wrote* indicates (by the subcat list; SUBCAT) that it selects for a subject and object noun phrase (*John* and *the letter* in the example given at 3.31a). These noun phrases are not analysed further, but referred to by the abbreviated signs np[nom] and np[acc] respectively. In the HPSG analysis, *the letter* combines with *wrote* by Schema 2, and *wrote the letter* combines with *John* by Schema 1, producing the tree shown in Figure 3.8.

### 3.5.2.2 The progressive aspect

In this section, I shall show how the syntactic structure of a sentence in the progressive aspect is constructed from the lexical items and thus demonstrate how the semantic features are built up from these lexical forms. I shall give the individual lexical entries for the verbal components of (3.32), repeated from (3.31b), and a tree to show the syntactic and semantic interpretation of the complete sentence.

(3.32) John was writing the letter.

A lexical rule is given (Figure 3.9) to derive the present participle from the base lexical entry of a verb (eg, *writing* is derived from *write*). Again, a function is used to derive the phonology, which for a regular verb consists roughly<sup>7</sup> of adding

<sup>7</sup>Omitting details of rules for removing the *-e* ending, doubling consonants, etc, which would be dealt with in a more detailed morphology.

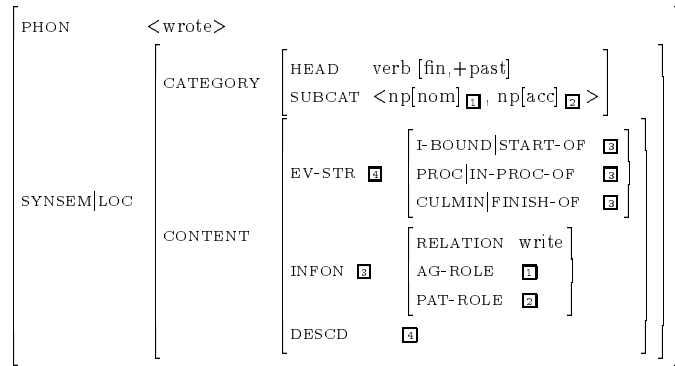


Figure 3.7: Feature structure for *wrote*

the suffix *-ing* to the base form of the verb. This lexical rule differs from that for the simple past in that it is the value of EV-STR|PROC which is token identical with DESC, indicating that the event referred to by the present participle is 'in process'. 'In process' corresponds to the value [IN-PROC-OF 3] where 3 is token identical with the values of INFON, indicating the particular event referred to. This is interpreted as meaning that "part of the PROC-phase of the event referred to is explicitly described". Hence, a different interpretation for viewpoint aspect is given from that for the simple aspect. The present participle does not carry any value for tense.

The base form of the verb to which this lexical rule can apply must contain at least a value PROC, but may contain other values corresponding to event phases. In section 2.5.2, the constraints on the ordering of event phases specify that a PROC-phase is temporally bounded by an I-BOUND-phase and either an F-BOUND- or a CULMIN-phase. The specification that the lexical rule applies only to verb forms with at least a PROC-phase (indicated in the left hand side of the rule, given in Figure 3.9) therefore restricts its application to process or culminated process expressions, as can be seen from the signs for event templates given in section 2.5.1. However, the analysis of culmination expressions in Chapter 4, determining that culminations are sometimes felicitous in the progressive, will lead to this lexical rule being modified slightly.

The auxiliary verb *be* subcategorises for a present participle (forming, for example, the verb phrase *was writing*), as well as complements, such as np[+prd], ap[+prd], etc, indicating predicative constructions. Present participles (vp[prp]) can be generalised as predicative, and the SUBCAT-list for the auxiliary *be* can be given

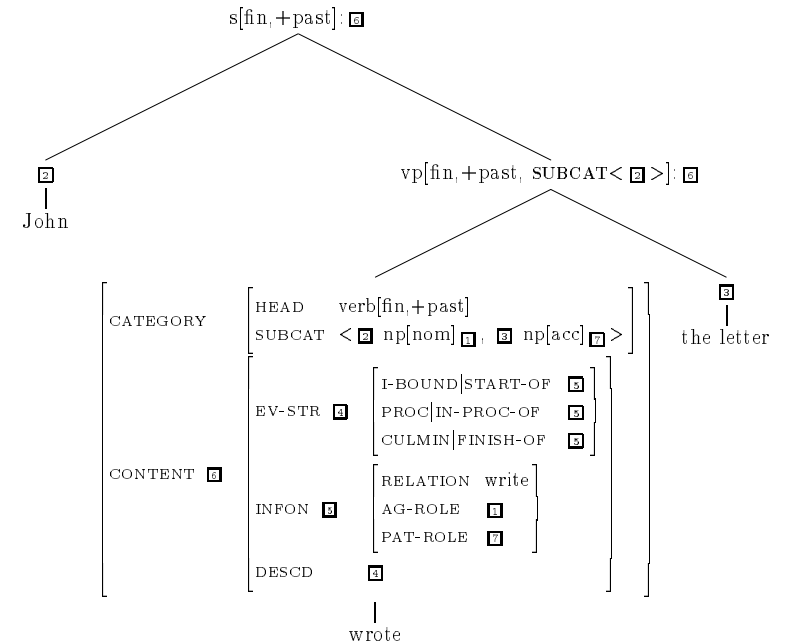


Figure 3.8: Tree for *John wrote the letter*



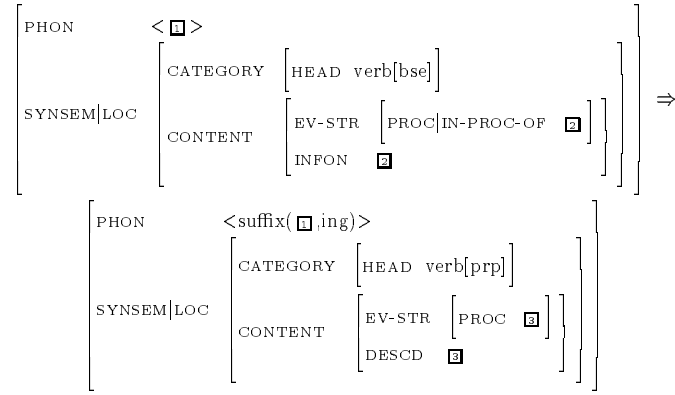


Figure 3.9: Lexical rule to derive the present participle form from the base form of a verb

as shown in (3.33).<sup>8</sup>

$$(3.33) \quad \text{SUBCAT} \langle \square, \text{xp}[+\text{prd}, \text{SUBCAT} \langle \square \rangle] \rangle$$

The auxiliary verb *be* carries tense, and application of a past tense lexical rule derives *was*, including a feature [PAST +]. The sign for *was* is given in Figure 3.11. *Writing* subcategorises for an np[acc], forming a verb phrase *writing the letter*, which is subcategorised for by *was*. This phrase in turn subcategorises for an np[nom], forming a complete sentence (3.32). The derivation of this example is shown in Figure 3.12.

The representation for the progressive proposed in this section reflects a number of assumptions about the interpretation of progressive aspect in English. These assumptions are also carried over to the interpretation of the imperfective in Russian (see section 3.5.3), since this viewpoint aspect is given the same interpretation of viewpoint aspect. The interpretation is the same even though the syntax of the Russian imperfective is different from the syntax of the English progressive.

The claims made for the English progressive and Russian imperfective are:

1. that they always explicitly describe part of a PROC-phase, ie an event in progress

<sup>8</sup>Note, that *be* subcategorises for XPs where the subject NP is structure shared with the subcategorised-for NP in the complement phrase's SUBCAT-list. Compare Pollard and Sag 1994: 132–135.

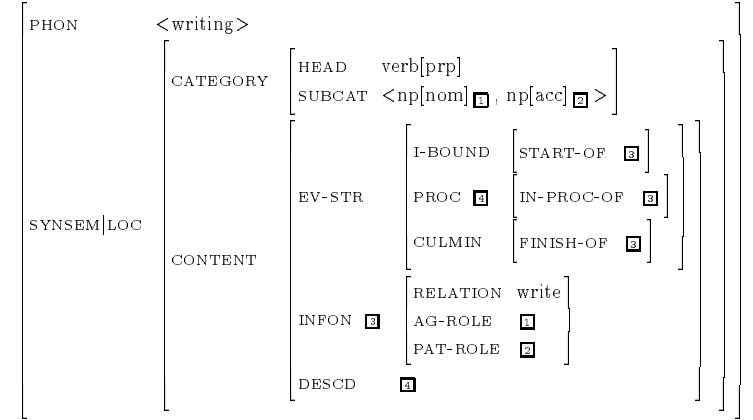


Figure 3.10: Feature structure for the verb *writing*, derived by the present participle lexical rule from the base form *write*

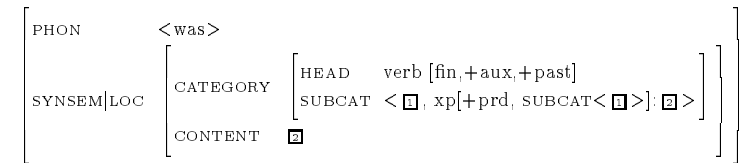


Figure 3.11: The sign representing the lexical entry of the past tense auxiliary *was*, which subcategorises for a subject noun phrase and an xp[+prd].  $\square$  represents the values of the feature CONTENT, and this is structure shared with the values of CONTENT of the complement that *was* subcategorises for, indicated by  $\square$  following the colon in the SUBCAT-list for *was*.



CONSEQU-STA is [HAS-OCCURRED  $\square$ ] (where  $\square$  is structure shared with the values of INFON), and for the perfect aspect it is this value which is token identical with the value of DESC. This allows the correct interpretation to be made for the perfect viewpoint aspect, which is carried by the past participle, eg *written*. Tense is carried by the auxiliary *have*. Like the interpretation of the progressive where it is part of the PROC-phase which is explicitly described (ie, the feature IN-PROC-OF is the value of DESC), it is part of the CONSEQU-STA-phase which is explicitly described by the perfect aspect (ie, the feature of HAS-OCCURRED is the value of DESC).

(3.34) John had written the letter.

In order to give an interpretation of (3.34), repeated from 3.31c, a new lexical rule is required to derive the past participle from the base form of a verb (Figure 3.13). This participle carries aspect, which is indicated in the derived sign by the feature DESC. The EV-STR of the past participle carries the feature CONSEQU-STA, which is not a value for any of the event templates given in Chapter 2. However, the constraint C4 on the ordering of event phases (section 2.5.2, see page 57) stipulates that a CONSEQU-STA-phase always temporally follows a CULMIN-phase, and so this phase is available to be explicitly described (the value of DESC) for any event with a CULMIN-phase.

The auxiliary verb *have* (the past tense of which is given in Figure 3.14) subcategorises for a past participle, and a subject noun phrase. A representation for (3.34) is given in Figure 3.15.

The template for any given event does not include a phase referring to the consequent state of the event, since this is not an integral part of the event's realisation, but a state which obtains after a culmination phase. But as long as the event template includes a CULMIN-phase, the past participle lexical rule can be derived, since a CONSEQU-STA-phase can be inferred by constraint C4.

### 3.5.2.4 Conclusion

Comparing Figure 3.15 with representations for the simple aspect (Figure 3.8) and progressive aspect (Figure 3.12), the only difference in the representations is the value of DESC, where here it is the consequent state phase which is explicitly described by the sentence. Because a consequent state phase temporally follows the CULMIN-phase of a template, the occurrence of the completed event is inferred by explicitly describing part of this phase. Therefore, the differences in the aspectual interpretation of these three examples is captured by the different values of DESC. This interpretation is carried up the tree providing contrasting aspectual interpretation for the sentences in (3.31).

## 3.5.3 Feature structures for Russian viewpoint aspect

In this section, I shall show how feature structure representations for the Russian imperfective and perfective aspects can be derived from the base form of the verb.

$$\left[ \begin{array}{l} \text{PHON} <\square> \\ \text{SYNSEM} \left[ \text{LOC} \mid \text{CATEGORY} \mid \text{HEAD verb}[\text{bse}] \right] \end{array} \right] \Rightarrow \left[ \begin{array}{l} \text{PHON} <\text{suffix}(\square, \text{ed})> \\ \text{SYNSEM} \mid \text{LOC} \left[ \begin{array}{l} \text{CATEGORY} \left[ \text{HEAD verb}[\text{psp}] \right] \\ \text{CONTENT} \left[ \begin{array}{l} \text{EV-STR} \left[ \text{CONSEQU-STA } \square \right] \\ \text{DESC } \square \end{array} \right] \end{array} \right] \end{array} \right] \right]$$

Figure 3.13: Lexical rule to derive the past participle form from the base form of a verb

$$\left[ \begin{array}{l} \text{PHON} <\text{had}> \\ \text{SYNSEM} \mid \text{LOC} \left[ \begin{array}{l} \text{CATEGORY} \left[ \begin{array}{l} \text{HEAD verb}[\text{fin}, +\text{aux}, +\text{past}] \\ \text{SUBCAT} <\square, \text{vp}[\text{psp}, \text{SUBCAT} <\square>]: \square > \end{array} \right] \\ \text{CONTENT } \square \end{array} \right] \end{array} \right]$$

Figure 3.14: The sign representing the lexical entry of the past tense auxiliary *had*, which subcategorises for a subject noun phrase and an past participle verb phrase (vp[psp]).  $\square$  represents the values of the feature CONTENT, and this is structure shared with the values of CONTENT of the complement that *had* subcategorises for. Note that this sign is similar to that for *was* (Figure 3.11), except that *had* subcategorises for a vp[psp] rather than an xp[+prd].



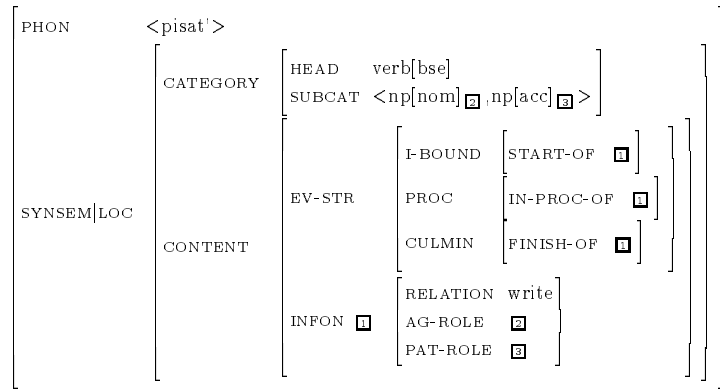


Figure 3.16: Feature structure for the imperfective verb phrase *pisat'* 'to write'

3.17) is therefore similar to that for the English present participle (Figure 3.9), except that tense is introduced in the former and not in the latter.

The past imperfective lexical rule is applied to *pisat'*, producing *pisal* as the value of PHON. A tree representation for (3.35) is given in Figure 3.18

The Russian imperfective therefore has the same interpretation as the English progressive, although the two interpretations are derived from different lexical rules, reflecting the fact that the category of aspect (expressed by DESCD) is carried by different features in the two languages. This interpretation holds for reference to single events; in Russian the imperfective aspect is also used to refer to iterated processes, and the interpretation of such sentences would require a coercion<sup>11</sup> to reflect this different kind of process. In English, iterations can be expressed by both the simple and progressive aspects. At this level of interpretation the imperfective and progressive aspects are not equivalent, but on the single event interpretation they are. This is reflected in the analyses where part of the PROC-phase of the event referred to is explicitly described.

### 3.5.3.2 The perfective aspect

The perfective aspect in Russian indicates completion of an event and, depending on context, it is either the whole of the event template which is explicitly described (like the English simple aspect), or part of the consequent state phase (like the English perfect aspect). As was discussed in section 3.2.1, both these interpretations indicate a completed event. The interpretation for the perfective is given with the

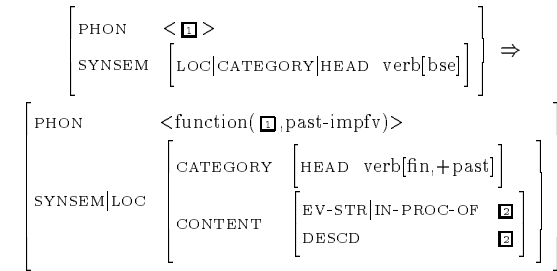


Figure 3.17: Lexical rule to derive the past imperfective form from the base form of a verb

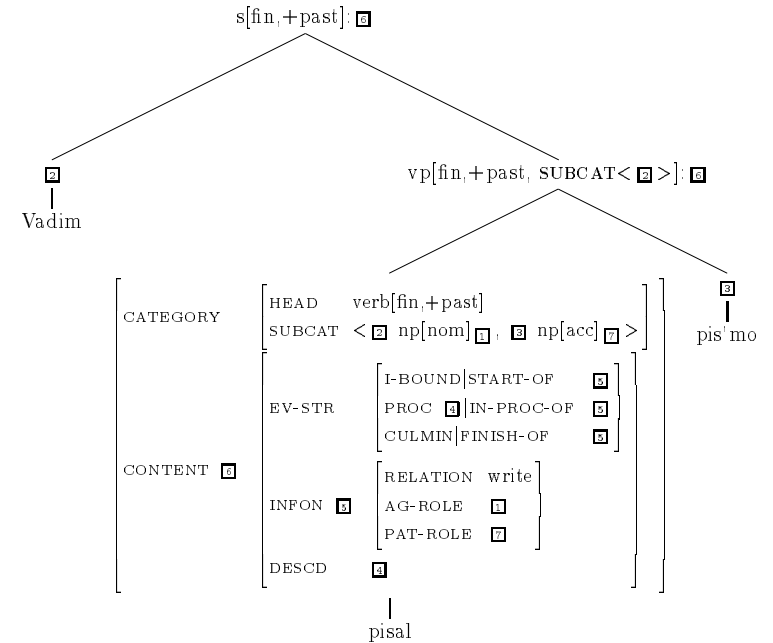


Figure 3.18: Tree for *Vadim pisal pis'mo* 'Vadim was writing the letter'

<sup>11</sup>See section 3.6.1 for details on such coercions.

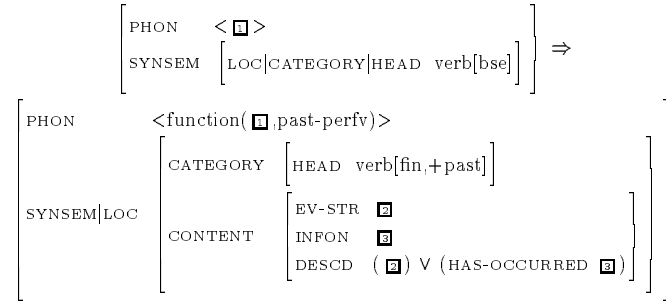


Figure 3.19: Lexical rule to derive the past perfective form from the base form of a verb

value of **DESCD** as either all the values of **EV-STR**, or as carrying the value of **HAS-OCCURRED**, the feature of **CONSEQU-STA**.<sup>12</sup> The past perfective lexical rule (Figure 3.19) derives a sign for the past perfective form *napisal* which indicates this aspectual interpretation. See Figure 3.20 for the interpretation of the whole sentence.

The perfective aspect in Russian corresponds to either the simple or perfect in English. Both these interpretations reflect the basic characteristic of the perfective as explicitly describing a completed event.

As was indicated in section 3.2.1, the completed event reading of the Russian perfective is the default with the result state reading inferred by contextual information. It was argued that both interpretations should be made in the semantics of the representation, which is disambiguated by a feature which is a value of **PRAGMATICS**. This feature could be named **DESCD** and take one of the possible values given in **SYNSEM|LOC|CONTENT|DESCD** as its value (the usual default for most discourse types indicating the completed event reading). This representation allows the pragmatic inference to alter the interpretation of the perfective aspect without contradicting the feature values represented at **SYNSEM**.

### 3.6 Event templates and a general theory of aspectual interpretation

In section 3.4, I described Moens' theory of aspect which consists of the tripartite event nucleus and an aspectual network licensing certain coercions from one event type to another.

<sup>12</sup>Compare the lexical rule for the imperfective where the value of **PROC**, which is **IN-PROC-OF** is structure shared with **DESCD**.

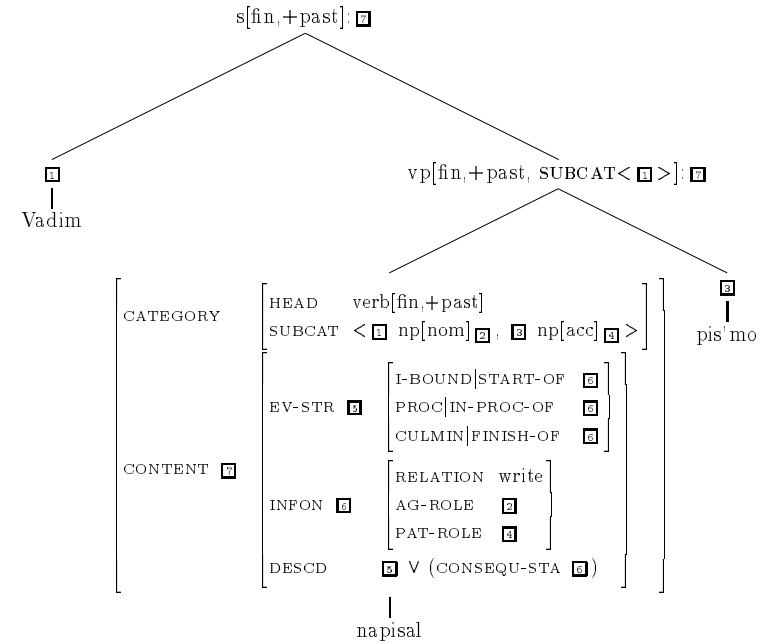


Figure 3.20: Tree for *Vadim napisal pis'mo* 'Vadim wrote the letter' or 'Vadim had written the letter'

The interpretation of viewpoint aspect given in section 3.5 shows how some of these coercions can be represented in an HPSG-style analysis, which combines syntactic and semantic information about a phrase or sentence and provides a representation which is built monotonically from the lexical items of the sentence. Because information about the event template manifests as feature values in the representation, and a part (or all) of that template is explicitly described, the resulting analysis preserves all the information built up in the process of the interpretation, being passed up to the sentence node by the Semantics Principle. Some of this information represents the aspectual class of the phrase or sentence (the event template), and other information represents an interpretation of viewpoint aspect (the value of **DESCD**). The value of **DESCD** reflects that part of the event explicitly described by the sentence.

In Moens' account, coercions change one event type into another, and although his final analysis is similar to the one presented in section 3.5, the underlying structure of the event expression is lost. A similarity is that a sentence in the perfect focuses on the consequent state part of the nucleus in Moens' analysis, ie, explicitly describes the **CONSEQU-STA**-phase of the event template in mine. However, the coercion results in parts of the nucleus being "stripped away" (introducing a non-monotonicity in the analysis) in order to focus on a particular part of the nucleus. The coercions are made at the model-theoretic level of interpretation, which allows a switch from one category to another without necessarily showing the relationship in terms of event structure between the two.

The interpretation of viewpoint aspect given in section 3.5 shows how viewpoint aspect can be interpreted as explicitly describing a part of the event template offered for a particular sentence or phrase: the details of the event template are specific enough to be able to systematically identify the relevant phase or phases to be explicitly described.

In section 3.4, I suggested that my analysis of viewpoint aspect corresponds to two of Moens' coercions (repeated in example 3.37 below). As discussed earlier, the aspectual network includes other coercions, however, which reflect other aspectual phenomena. By including these coercions in the network, Moens succeeds in presenting a general account of aspectual interpretation. In the remainder of this chapter, I shall consider

1. how these other coercions which Moens proposes in the transition network can be accounted for within the current approach, thus extending the current analysis as a more general theory of aspectual interpretation. The types of coercion were outlined in examples (3.28)–(3.30) in section 3.4, and are repeated below in (3.37)–(3.39); and
2. what other aspectual markers could be interpreted within the current analysis.

The remaining two chapters will develop the analysis further by giving a comprehensive treatment of two of the major issues arising from the discussion in the following two sections (3.6.1 and 3.6.2).

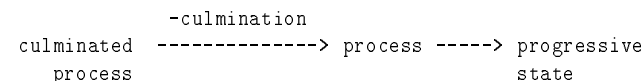
### 3.6.1 Event templates and Moens' aspectual network

In Moens' account, transition from one aspectual category to another involves the addition or removal of certain information: a transition from a culminated process to a process expression involves "stripping away" the culmination point, or, in the other direction, adding "an extra 'layer' of meaning to the 'basic' meaning of the category" (Moens 1987: 45). Although he points out that this metaphor should not be interpreted too literally, Moens does not show explicitly the relationship between, say, a culminated process expression and the preparatory phase resulting from "stripping away" the culmination point. Sometimes the transition indicates an expression belonging to a different aspectual class, and sometimes it indicates an interpretation of viewpoint aspect. In the feature structure analysis proposed in this thesis, aspectual class is represented by different event templates, and the ontological relationship between each of them is apparent by comparing their make-up, ie what event phases they have in common. In terms of viewpoint aspect, the fact that the values of **EV-STR** in the feature structure can be represented independently of the value of **DESCD** also allows the relationship between references to event phases to be made explicitly, without having to "strip away" any references to these phases.

Following is the list of the coercions licensed by transitions in Moens' aspectual network, repeated from (3.28)–(3.30). In this section I will show how the coercions motivated by Moens correspond to the feature structure analysis in this thesis. I do not explicitly use coercions in the analysis of viewpoint aspect. However, the two level analysis in terms of the referred-to template and the part which is explicitly described corresponds to the Moens' coercions in the aspectual network. Below, I shall discuss how each of the transitions can be accounted for in the feature structure representation, exploiting the fact that event templates comprise individual values representing event phases.

The analysis of viewpoint aspect already presented in this chapter shows how part of Moens' aspectual network can be incorporated into an analysis of aspect which is derived from the syntactic elements of the sentence. The analyses of the perfect and progressive viewpoint aspects correspond to the coercions in (3.37). The accounts for these viewpoint aspects reflect the transitions in (3.37) from Moens' network. The two coercions in (3.38) and (3.39) also reflect the semantic interpretation of individual elements of a sentence (eg, the plurality of a noun phrase) and will be discussed below.

- (3.37) Two coercions corresponding to 'viewpoint' aspect (eg, progressive, perfect aspect in English; perfective, imperfective in Russian)
- (a) Corresponding to the progressive:  
eg, *John wrote the letter* vs *John was writing the letter*  
transitions:



(b) Corresponding to the perfect:  
eg, *John arrived* vs *John had arrived*  
transition:

(consequences)  
culmination -----> consequent state

- (3.38) Coercion corresponding to changing event reference within the sentence, eg the presence of certain prepositional phrases which affect the aspectual class of a sentence  
eg, *John ran (in the park)* vs *John ran to the station*  
transition:

+culmination  
process -----> culminated process

- (3.39) Coercion corresponding to iterating references to events  
eg, *John arrived at 2pm* vs *Every day John arrived at 2pm*  
eg, *John wrote a letter* vs *John wrote letters* transitions:

culmination >---\  
culm'ed process >--- ---> point -----> process  
process >---/ (iteration)

### 3.6.1.1 Changing aspectual class

(3.38) corresponds to the interpretation of some verb phrases which are process expressions in their base form (that is, *run* as an intransitive verb is a process expression) but can take an optional prepositional phrase (PP). If the PP is a locational adverbial, then it refers to the location where the process event could potentially be culminated. I do not give a detailed aspectual interpretation of verb phrases at this level; however, an analysis could be envisaged in which a PP of this type (or other syntactic category with a similar interpretation) carries some feature (say, [CULMIN +]) in its semantics, which indicates that a CULMIN-phase is added in as a value of EV-STR. In this way, the process expression (consisting of I-BOUND-, PROC- and F-BOUND-phases) acquires additionally a CULMIN-phase. This coercion therefore depends on an interaction between the semantics of the PP and the verb phrase. The interpretation of the phases (ie, their temporal ordering) would need to stipulate the relationship between the CULMIN-phase and the end of the PROC-phase, ie how F-BOUND and CULMIN relate to each other. Intuitively, these two end bounds would probably be co-temporal, in that the expected ending (the F-BOUND-phase) of the event referred to by the process expression is now a CULMIN-phase. In terms of the current analysis, expressions such as *John ran* and *John ran to the station* will be given interpretations as process and culminated process expressions respectively, without showing a detailed analysis of how one is derived from the other. Viewpoint

aspect and other aspectual relations (discussed in the following chapters) can then be applied to those forms in the standard way. However, I have given only an indication here of how the coercion could be dealt with, but this is not a full analysis.

Moens' aspectual network is intended to capture possible changes in aspectual class in a sentence from a base classification for a verb. As has been noted in the literature (Verkuyl 1972, Dowty 1972, Dowty 1979), the aspectual class of a verb phrase is affected by subject and object noun phrases, prepositional phrases, temporal adverbials, etc.

Pairs of examples like *John ran to the station* and *John ran* are used by Moens to demonstrate that the aspectual class of a sentence can be derived from the base aspectual class of a phrase by following valid paths in the transition network. These coercions are induced by semantic context (such as this locative prepositional phrase which would carry a feature indicating this reading).

He notes that this treatment at the model-theoretic level explains the change in aspectual class at a semantic level, unlike Verkuyl's approach in which syntactic features determine the change of aspectual class (Verkuyl 1972). A more detailed analysis of the structure of NPs and their effect in determining the aspectual class of a sentence, like that given by Krifka (1992), could be incorporated into a feature structure analysis.

In particular Krifka gives a detailed analysis of the effect of plural NPs on the aspectual class of a sentence. This analysis corresponds to Moens' coercion (3.39). A sketch of how an analysis might look is given in Figure 3.21. These examples would require an aspectual interpretation relating to plurality of noun phrases, and scoping of iterative adverbials such as *every day*.

*John wrote a letter* explicitly describes the completion of one *letter-writing-event*, whereas *John wrote letters* explicitly describes a number of such events. Iterations test as process expressions, and they are classified as iterated processes by Moens. This implies that the related template for examples like *John wrote letters* should be for a process expression; *Write* as a transitive verb is a culminated process expression, and the coercion proposed by Moens shows the relationship between this and the iterated process. There is first a coercion to a point expression and these point expressions can then be iterated, forming an iterated process expression. Intuitively, *John wrote letters* explicitly describes a series of completed culminated process expressions, referring to *letter-writing-events*, and it is this series which makes up an *iterated process*. So, a new template could be introduced in the analysis (representing a process expression), of which the PROC-phase refers to a series of culminated process expressions. In Moens' analysis, the series is a series of point events. See Figure 3.21.

However, it is not clear how this kind of analysis would be generated from the syntactic information available, and a more detailed account of the semantics of iterated processes would be needed to give a full account. This sketch at an interpretation suggests that the iteration of the process would require additional allowable values for CONTENT. The coercion could potentially be represented by adding further information without changing information already in the representation, thus



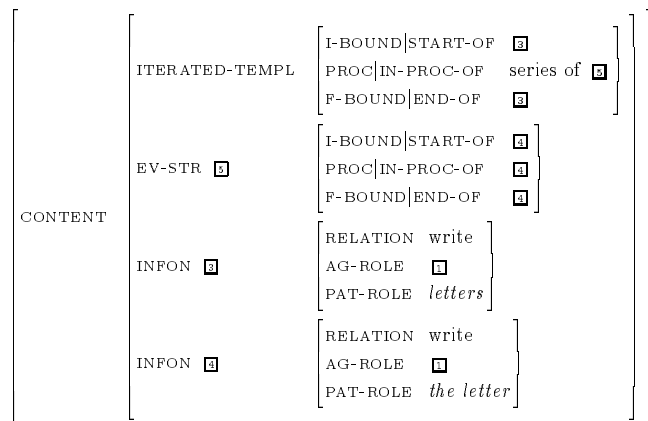


Figure 3.21: Some of the possible values of CONTENT for a sentence such as *John wrote letter*. A sketch of how such an iterated process expression may be represented is given. This is illustrating the relationship between a culminated process expression (represented by [CONTENT|EV-STR a]) and a series of such events (represented by the value of [ITERATED-TEMPL|PROC|IN-PROC-OF], which is a ‘series of’ events of *writing the letter*).

potentially leading to a compositional and monotonic account. I shall however leave this example aside at this point, and turn to another example of coercions.

### 3.6.1.2 Internal structure for culminations

The coercions discussed so far have corresponded to syntactic constructions which are easily identified, and most require just one or two transitions on the aspectual network. In this section I turn to an example of a culmination expression in the progressive aspect. For example, the coercion relating to *The bomb was exploding* (given in example 3.40) is somewhat more complicated. Moens discusses examples where the preparatory process of a culmination is referred to (Moens 1987: 78–79), which “allows one to look ‘inside’ the apparently punctual event”, and effectively coerces the expression into a culminated process expression. *The bomb exploded* can be referred to by the progressive *The bomb was exploding*, ie, ‘the bomb was in the process of exploding’ in Moens’ terms. However, in order to interpret the progressive aspect correctly, the culminated process expression resulting from the first coercion (indicated in example 3.40) must be further coerced through a process expression to a progressive state expression (ie, the coercion in 3.40 is then followed by the coercion for the progressive in 3.37).

- (3.40) Coercion corresponding to the use of the progressive with culminations  
eg, *The bomb exploded* vs *The bomb was exploding* transition:

+prep process  
culmination -----> culminated process

followed by the coercions for the progressive in (3.37)

Although Moens’ proposed transitions provides a valid path reaching the required final aspectual category, three transitions are necessary, and it is not clear how each of the transitions relate to the syntactic structure of the sentence. Also, two interpretations are given for *The bomb was exploding*, implying that there are two types of preparatory processes which an expression like *explode* can refer to. The different readings will be illustrated and discussed in more detail in section 4.2.2.3. In Chapter 4 an alternative analysis is proposed, which follows straightforwardly from the analysis in section 3.5. In order to incorporate interpretations of sentences which require this series of transitions into the aspectual theory proposed in this thesis, this analysis requires a more detailed event template for culmination expressions. This template builds on those already proposed for each of the aspectual classes, adding more features which correspond to event phases referring to the internal structure of these event types. The event ontology is thus extended in a principled way to account for various linguistic data, to maintain a consistent interpretation of viewpoint aspect, and to model the transitions for examples like those in (3.40).

The final analysis provides a compositional account of culmination expressions in the progressive, in which the transitions proposed by Moens can be traced, but

where the relationship between the parts of the event template (parts of which relate to his tripartite event nucleus) referred to can be clearly seen in the analysis. The analysis proposed in section 3.5 is therefore extended in a principled way to give a straightforward account of culminations in the progressive.

### 3.6.2 Event templates and other aspectual markers: aspectual verbs

The feature structure representation of event templates allows certain phases of the templates to be explicitly described: the progressive aspect in English explicitly describes part of the **PROC**-phase; the perfect in English explicitly describes part of the **CONSEQU-STA**-phase. The diagnostic tests for aspectual class use various temporal adverbials (eg, *for*- or *in*-adverbials) which scope over a duration corresponding to a particular phase of the event templates. An obvious question to ask, given these observations, is whether other event phases can be explicitly described by particular syntactic forms. The event phases have so far been motivated by intuitions about their relative duration (ie, whether a **PROC**-phase is motivated by linguistic data, or whether the event is perceived as taking place instantaneously), and how they end (ie, with an **F-BOUND**- or **CULMIN**-phase). However, if there are syntactic forms which explicitly describe these bounds, this will provide further motivation for use of these categories within the analysis presented here.

Verbs like *start*, *continue*, *stop* and *finish* all take verbal complements, and refer to a part of an event and some of these verbs have already been used in the diagnostic tests in Chapter 2. A closer look at these verbs indicates that they can be given interpretations based on the event templates motivated in this thesis. These verbs will be analysed in detail in Chapter 5, demonstrating that the analysis developed here can be extended to other aspectual interpretations.

### 3.6.3 Conclusion

Moens' aspectual network provides a unified approach to aspectual interpretation by indicating valid transitions around the network. I have indicated how some of the transitions relate to the analysis of viewpoint aspect given in section 3.5, and what other aspectual coercions the other transitions represent. I suggest how some of them may be formalised in an HPSG-style representation. In the next two chapters, I shall focus on two particular problems and give a detailed analysis of them within the framework.

## 3.7 Conclusion: A general theory of aspectual interpretation

In the preceding chapters I have motivated an analysis of aspectual class consisting of separate event templates for each of the aspectual classes. These are cast in an

HPSG-style framework represented by the feature **EV-STR** which is a value of **CONTENT**. Viewpoint aspect is interpreted by focusing on specific parts of the templates, and these are marked as being explicitly described. Examples are given for reference to single events in the past tense, and analyses are given for English and Russian examples. The interpretation of viewpoint aspect in these two languages can be compared, and it can be seen that, for single events, the progressive in English and imperfective in Russian have the same interpretations. The simple aspect in English is analysed as explicitly describing the whole of the event template referred to, while, following Moens, the perfect explicitly describes the consequent state phase following a **CULMIN**-phase. The Russian perfective can have either of these interpretations depending on the context, and the interpretation is presented as a disjunction in the analysis. Both of these interpretations carry the main characteristic of perfectives, namely that the event is completed, but the perspective is slightly different for the two forms. The Russian perfective cannot be said to equate with a 'perfective' aspect in English, but the relationship between the forms in the two languages can be clearly seen in the representation. For the examples considered, the representation allows the correct interpretations to be given with the required nuance, while reflecting the main characteristics usually associated with the two viewpoints.

While the analysis is similar to Smith's two-component theory of aspect, it provides a more detailed set of event phases which can be explicitly described. The analysis therefore allows for the different interpretations of the three English forms and the two Russian forms to be compared. In the sense that there are various nuances of viewpoint aspect, Smith's classification of viewpoint aspect as either perfective or imperfective<sup>13</sup> is too strong. However, the contrasting features (eg, completed event vs ongoing event) between perfective and imperfective are present in the representation, thus reflecting the traditional dichotomy.

The framework is therefore sufficiently flexible to give an interpretation of different aspectual forms reflecting the part of the event explicitly described, and the traditional semantic features of the perfective and imperfective aspects are also reflected in that interpretation. This perspective on viewpoint aspect is taken further in Chapter 5, in which *started writing a letter*, for example, is shown to explicitly describe a completed event of *starting* (being in the simple aspect), but refer to an ongoing (and possibly incomplete) event of writing. In this sense, aspectual verbs present another means of expressing a viewpoint or point of view on an event. The perfective feature of a completed event is applied to the *starting*-event, but the ongoing nature of the event is represented by the event structure corresponding to the aspectual class of *write*.

In this chapter I compared the analysis with Moens' aspectual theory, and in particular his aspectual network. I indicated which transitions correspond to the interpretations given so far. In the next chapter (Chapter 4) I suggest how other transitions could be accounted for in this theory, focusing on one particular problem: the structure of culminations. In Chapter 4, a detailed account of the behaviour of

<sup>13</sup>Or neutral for some constructions, but Smith does not claim that either English or Russian have a neutral viewpoint aspect, so this is not considered in the current discussion.

culminations is given. Broadening the perspective, I then consider how aspectual verbs can be incorporated into the aspectual theory developed up to this point. This will be the subject of Chapter 5. While the analysis of culminations in Chapter 4 is motivated independently from interpretations of aspectual verbs, that chapter prepares the final piece of groundwork for a straightforward interpretation of aspectual verbs in the current theory. By accounting for aspectual verbs using the event phases motivated in Chapter 2, the theories of aspectual interpretation offered by Smith and by Moens are extended to include this class of aspectual markers, thus providing a more general theory of aspectual interpretation. It also underpins the motivation for the event phases independently of arguments in favour of these features which have been put forward up to this point.

## Chapter 4

# Culminations and their Internal Structure

### 4.1 Introduction

In the previous chapters, I have motivated a set of event templates which reflect the internal structure of different event types (aspectual classes), and a feature **DESCD** relating to the viewpoint aspect of a sentence, which identifies a particular part of an event template, marking certain event phases as being explicitly described by the sentence.

Culmination expressions are one of the aspectual classes identified in Chapter 2, and I motivated a representation of these expressions with an event template consisting of just a culmination phase and a consequent state phase, reflecting the intuition that such events are perceived by language users as being punctual (*at*-adverbials, for example, are perceived as explicitly describing the whole of the event as taking place at that particular time, eg, *John arrived at 2pm*). Different parts of the template are explicitly described depending on the aspect used, eg the culmination phase for the simple aspect in English, where the value of **DESCD** is [CULMIN|OCCURRENCE-OF  $\square$ ],  $\square$  corresponds to the values of **INFON** which represent the event referred to in the sentence. For the perfect aspect, the consequent state phase is explicitly described, so the value of **DESCD** is [CONSEQU-ST  $\square$ ], where  $\square$  again corresponds to the values of **INFON**.

Culmination expressions are the focus of attention in this chapter. I discuss the representation for culmination expressions from two perspectives: (1) a second level of structure for culminations is motivated to account for culminations in the progressive (section 4.2), and (2) I show how inferences can be made between culmination expressions and some durative expressions (section 4.4). A representation for culmination expressions is given in section 4.3.

Having motivated a representation of culminations as instantaneous events, I show that in certain contexts culminations can be perceived as having duration. I extend the representation of culmination expressions to account for this by introducing a second level of structure which includes a **PROC**-phase. This level is however

subordinate to the main representation for culminations, in that the second level or internal structure is introduced as a value of the feature **EV-STR** alongside the value of **CULMIN-phase**. The **CULMIN-phase** represents the perceived instantaneity of culminations, and it is this phase which is explicitly described by the simple aspect (in English) and the perfective (in Russian). On a single event reading, culminations are sometimes felicitous with the progressive (in English) and imperfective (in Russian), but often are not. In those contexts where the progressive or imperfective are acceptable, the internal structure can be referred to; if the progressive is not acceptable, the internal structure is not available for reference and this is usually determined by contextual factors. The progressive and imperfective viewpoint aspect explicitly describe part of the duration of the event (ie, part of the **PROC-phase**), and for culminations this usually reflects a perceived duration of an event which is normally instantaneous. This produces a dramatic effect, available only in certain contexts. For example, *John looked out of the window. The taxi was arriving.*

In section 4.2, linguistic data is presented to motivate this distinction, and event templates representing the internal structure are proposed in section 4.3. Analyses of examples in various viewpoint aspects are given in this section illustrate how this second level of representation is incorporated in the feature structure representation discussed in Chapter 3.

In section 4.4, I consider how certain events are related to each other in the real world, and how inferences can be drawn about their relationship with each other within a linguistic context. For example, (4.1a) is a culminated process expression, culminating when the climber finishes climbing (4.1b). The culmination of finishing, which corresponds to the **CULMIN-phase** of the template for the culminated process expression.

- (4.1)    a.    climb a mountain  
           b.    finish climbing a mountain

- (4.2)    a.    reach the top of the mountain  
           b.    was reaching the top of the mountain

(4.2a) can also describes the **CULMIN-phase** of an event of climbing a mountain. There is an inference that (4.1b) and (4.2a) can, given the right context, refer to the same eventuality in the world. On a pragmatic level a link can be made between these event references. The culmination expression in (4.2a) is therefore linked with the **CULMIN-phase** which is part of the event template of (4.1a).

On one level of analysis, both (4.1b) and (4.2a) are instantaneous events. However, they can both be described using the progressive aspect (see, for example 4.2b), which adds an element of duration to an event usually perceived as taking place at an instant. The internal structure of culminations proposed in section 4.3 facilitates an analysis where the progressive can be combined with culmination expressions. However, the primary representation of the culmination expression as an instant is necessary to relate it to the **CULMIN-phase** of a culminated process expression.

In this chapter, I therefore show that inferences about the relationship between different parts of an event can be drawn. These events might be referred to by the same verbs, eg *climb a mountain* vs *finish climbing a mountain*, or by different verbs, eg *climb a mountain* vs *reach the top of the mountain*. Such links between event templates are further discussed in Chapter 5, where a similar analysis is proposed to account for various aspectual verbs, such as *start*, *stop*, *finish*, and *continue*.

## 4.2 The structure of culminations

In section 4.2.1, I provide additional motivation for treating culminations as instantaneous events, contrasting with durative expressions (culminated process and process expressions). However, I also indicate that there are exceptions to this treatment of culminations. In section 4.2.2, these exceptions are brought to the fore, and I argue that the introduction of a second level of structure for culminations can account for these exceptions.

### 4.2.1 Culminations as point events: motivation

Following from section 2.4.2 in Chapter 2, in this section I provide additional motivation for representing culmination expressions as instantaneous expressions (represented by the **CULMIN-phase** in terms of event phases), contrasting with culminated process and process expressions which have duration (represented in terms of event phases by the **PROC-phase**).

In Dowty (1979), tests are offered to distinguish these three categories, which are referred to as achievements, accomplishments and activities respectively (Dowty uses Vendler's terminology). Later, Dowty (1986) provides temporal discourse interpretation rules which do not distinguish between achievements and accomplishments: the reference time for both achievement and accomplishment sentences in the simple aspect is updated in the discourse model Dowty proposes. He argues that this is fine, because there is no need to distinguish the categories in his theory. For telic events, the simple aspect indicates forward movement of time in discourse. Since both event types (achievements and accomplishments) are telic, no distinction between the two categories is necessary for *discourse* interpretation. However, on a sentence level analysis (which is the main focus of the analysis in this thesis), a distinction can be drawn between the two categories, and in Dowty (1979) tests are offered which provide a reasonably clear-cut method of distinguishing achievements (ie, culmination expressions) from accomplishments (ie, culminated process expressions). I draw on these tests in the following sections to demonstrate the distinction. For the purposes of discourse interpretation, both achievements and accomplishments in the simple aspect (in English) or perfective aspect (in Russian) generally indicate a forward movement of the temporal discourse referent.<sup>1</sup> Dowty's analysis is not compromised by distinguishing between the categories on a sentence level.

<sup>1</sup>The progressive and imperfective act as backgrounders and do not advance the reference time.

#### 4.2.1.1 Progressive aspect

Dowty notes that culminations (abbreviated Cul) in the progressive often sound bad because they are perceived as instantaneous events. However, there are some acceptable cases, although a particular context is often necessary.

- (4.3) a. \*John was noticing the man. (Cul)  
 b. ??John was realising what the answer was. (Cul)
- (4.4) a. okay: John was arriving. (Cul)  
 b. okay: John was reaching the summit. (Cul)

This contrasts with culminated processes (abbreviated CP), for which the progressive is always acceptable:

- (4.5) John was writing the letter. (CP)  
 (4.6) John was building a house. (CP)

The 'progressive test' does not, however, constitute a clear-cut test for distinguishing the two classes, as the examples in (4.3) and (4.4) show, but the acceptability of the progressive aspect for some expressions which, according to other diagnostic tests, behave as culminations is one of the motivations for giving an internal structure to culminations (see section 4.2.2). The following tests show that culminations are usually perceived as occurring instantaneously.

#### 4.2.1.2 Complement of *stop*

*Stop* is okay as a complement of culminated processes but bad with culminations, in most if not almost all contexts:

- (4.7) John stopped writing the letter. (CP)  
 (4.8) \*John stopped arriving. (Cul)  
 (4.9) \*John stopped reaching the top of the mountain. (Cul)

#### 4.2.1.3 Complement of *finish*

Dowty suggests that *finish* is bad with a culmination as its complement. While it is not totally acceptable, *finish* is better than *stop*. In contrast, *finish* is fine with culminated processes.

- (4.10) John finished writing the letter. (CP)  
 (4.11) ?John finished arriving. (Cul)  
 (4.12) ?John finished reaching the top of the mountain. (Cul)

If examples (4.11) and (4.12) do have an interpretation then this implies the event has taken time to occur, ie is not instantaneous. This explains the fact that these examples are marginal: intuitively they should not be acceptable if culmination expressions are instantaneous, but one can imagine a context where they would be okay. In terms of my templates *finished* explicitly describes the CULMIN-phase of the internal structure for culmination expressions<sup>2</sup>, which effectively indicates that the event has happened. Since culminations typically take relatively little time to take place in the real world, it seems more appropriate to describe the completed event by referring to the whole event (ie, the culmination in the simple aspect without *finish* or other aspectual verbs), unless some particular dramatic effect is required. Hence, in certain contexts these sentences may be acceptable, but usually the simple aspect is sufficient to convey this meaning.

#### 4.2.1.4 Ambiguity with *almost*

The adverbial *almost* describes a time just before the occurrence of an event. (4.13) has two interpretations.

- (4.13) John almost wrote the letter. (CP)

One where John almost sat down to write the letter (ie almost started the letter, referring to the event's initial bound), and one where he almost completed the letter (ie, referring to the other bound—the CULMIN-phase—which is part of the template for culminated processes.

For culmination expressions there is only one interpretation for *almost*:

- (4.14) John almost arrived. (Cul)  
 (4.15) John almost reached the summit. (Cul)

Here, it can only mean that John almost reached his destination or goal, but didn't quite make it. If culminations only have a CULMIN-phase in their templates, there is only one punctual phase for the reference of *almost* to precede. This observation about *almost* provides a clear distinction between culminated process and culmination expressions.

This observation suggests an account of *almost* which explicitly describes a time which is part of the phase preceding either an I-BOUND-phase or CULMIN-phase, and this account would hold for the examples in this section. For process expressions, *almost* is not ambiguous and indicates the time before the I-BOUND. The interpretation of (4.16) is that John didn't push the cart at all, but was about to, or wanted to, or tried to no avail; in each case explicitly describing a time immediately before the I-BOUND relating to a *pushing*-event. The template for process expressions does not include a CULMIN-phase, and so only one interpretation is expected.

- (4.16) John almost pushed the cart.

<sup>2</sup>The internal structure is motivated in section 4.2.2. See section 4.3 for event templates showing this CULMIN-phase.

#### 4.2.1.5 *At-adverbials*

The punctual *at*-adverbial picks out the whole of a culmination event (4.17). For culminated process events, if the *at*-adverbial is acceptable at all, then it also tends to explicitly describe the whole of the event, because culminated process expressions are durative, *at*-adverbials often sound odd. This is because the whole event is usually difficult to imagine occurring within the short space of time suggested by the adverbial. In some contexts the *at*-adverbial may refer to the start of the culminated process. An interpretation for culminated process expressions can be forced by reinterpreting the adverbial as meaning *around*, and still the event must take place within a relatively short time span (4.18).

(4.17) John arrived at 6pm → *whole event occurs at 6pm* (Cul)

(4.18) ??John wrote a letter at 6pm → John started writing at 6pm. (CP)  
or: → John wrote a letter at around 6pm.

(4.19) \*John built a house at 6pm. (CP)

(4.20) a. John wrote the note at 6pm / John wrote the note at 6:03pm.  
b. ??John wrote the letter at 6:03pm.

Certain examples are easier to interpret as 'punctual' than others; contrast (4.20a) and (4.20b). (4.20a) is okay because the note can be brief and be written within the indicated time, ie, within approximately one minute. This does not necessarily suggest that the expression is a culmination rather than culminated process expression, but that inferencing about the length of time an event takes to occur in the real world does have a role to play in the interpretation of event expressions; the time scale over which the event unfolds in the real world is determined by reasoning with knowledge about the event's realisation. The event phases do not have a particular duration of time associated with them, since this varies according to the referred-to event and the context of its use. According to other tests, the expression may still pattern as a culminated process: eg, (4.21) doesn't entail the completion of a culminated process expression, and this has a different interpretation from (4.20), because the time scale of the event is longer (five minutes or so) than that for (4.20) (one minute or so). According to the tests in Chapter 2, this phrase patterns like a culminated process expression.

(4.21) John wrote the note for 5 minutes, but didn't finish it because he couldn't think of the most appropriate phrase.

#### 4.2.1.6 *In-adverbials*

The durative *in*-adverbial refers to the time taken to complete the whole of a culminated process, but refers to the period before a CULMIN-phase for culmination expressions.

(4.22) John wrote the letter in 2 hours. CP

(4.23) John arrived in 2 hours. Cul

In both cases, the time before the culmination phase in the event templates is explicitly described. According to the templates I propose, this is a PROC-phase for culminated processes, and a state phase for culminations. The two examples don't in themselves distinguish between culminations and culminated processes. However, considering what time period the following two examples refer to, (4.24a) refers to a time before the writing of the letter, before the two hours starts. (4.24b) also refers to a time before the *arriving*-event, within the period *in two hours*.

(4.24) a. John was about to write the letter.  
b. John was about to arrive.

This implies that the *in*-adverbial refers to the duration of time it takes to execute the *writing*-event, but describes a period wholly prior to the occurrence of the *arriving*-event. In this way, culminated process and culmination expressions are distinguished as separate aspectual categories.

#### 4.2.1.7 *For-adverbials*

(4.25) John was writing a letter for an hour  
→ John spent an hour writing (CP)

(4.26) \*John was arriving for an hour. (Cul)

Culminations and culminated processes behave differently with *for*-adverbials. The time span referred to by a *for*-adverbial generally refers to a period not leading to a culmination. For culminated processes, this is the PROC-phase before the CULMIN-phase in the template, which is best referred to with a progressive:

(4.27) a. ??John wrote the letter for 2 hours  
b. John was writing the letter for 2 hours.

(4.28) a. ??John built the house for 2 days  
b. John was building the house for 2 days.

Culminations do not usually pattern well with *for*-adverbials since there is no obvious period of duration which the durative adverbial can span (unless the subject is in the plural in which case the expression is coerced into a process expression, as was suggested in section 3.6.1.1). However, in some contexts, *for*-adverbials are felicitous with culmination expressions, referring to a time after the culmination event takes place, and prior to it being 'undone', ie spanning the period of the CONSEQU-STAGE-phase.

- (4.29) ?John arrived for 2 hours.
- (4.30) ?The car arrived for 2 hours.
- (4.31) John left the room for 2 hours.
- (4.32) The sheriff jailed Robin Hood for 2 years. (Hitzeman 1993)

#### 4.2.1.8 Conclusion

The above tests demonstrate that culminations should be treated as punctual events (reflected by my templates) and culminated process expressions as durative events.

### 4.2.2 Culminations and their internal structure: motivation

On the basis of the tests in section 4.2.1, there is a case for distinguishing between culmination expressions as instantaneous events and culminated expressions as durative events and this can be achieved by representing the internal structure of the event templates differently. This analysis formed the basis for motivating the event templates for culmination and culminated process expressions in section 2.4 of Chapter 2. Distinguishing the aspectual classes with these different event templates does not affect the temporal interpretation of events on a discourse level, since both event types, when used in the simple or perfective aspects, can be identified as moving the narrative time forwards (eg, by updating a reference time relating to the described event, as Dowty 1986 suggests).

Smith (1991) also maintains a distinction between achievements and accomplishments (culminations and culminated processes respectively). She argues mainly from an intuitive-conceptual point of view, eg whether there is an associated preliminary process which is part of the event (achievements), vs the existence of a preliminary process which does constitute part of the event (accomplishments). Arguing from this conceptual point of view is useful but it does not motivate the need to distinguish categories for a linguistic theory. The tests in section 4.2.1 are intended to substantiate Smith's arguments with natural language examples. Smith proposes a schema for achievements consisting of simultaneous initial and final points and the result is a change of state. This is conceptually the same as providing a template consisting of just a CULMIN-phase, which in my analysis is followed by a CONSEQUENTA-phase, marking a 'resultant state' (Smith's term) or 'consequent state' (Moens' term).

Dowty also points out that the distinction traditionally drawn between achievements and accomplishments may be one of relative perception of the events' duration by language users. Culminations (achievements) are considered to be punctual events which occur seemingly instantaneously, whereas culminated processes (accomplishments) take time to occur. However, looking at the detail of any event, a physicist would claim that there is duration involved in any event, eg the event of entering a house (usually categorised as a culmination) may seem not to take time, but does involve time taken by the agent lifting her foot and placing it on the other side of

the threshold; a *starting*-event like starting to write a letter involves finding paper and a pen, sitting down at a desk and making the first marks on the page, but the verb describing the *starting*-event is often categorised as a culmination rather than a culminated process. The physicist's argument can be employed equally well the other way round: it may be argued that reaching the finish line in a race has no duration at all, and that the sentence *John reached the finish line* can describe only an instantaneous point in time. However, in some contexts, the sentence *John was reaching the finish line* or *John was crossing the finish line* (referring to the same action) may be acceptable, with an interpretation in which the *reaching*-event takes time (or is at least represented by the language user as taking time). So, although *reach the finish line* behaves as an instantaneous event according to the tests, in some contexts it can be perceived as taking time. The relative duration of an event is determined by the event in question, the language user's understanding of how long that kind of event typically takes, and the contextual factors which may affect the length of that period of time. These factors are different from the linguistic behaviour of expressions referring to events. Culmination expressions are typically reflected by adverbial use as if they are punctual. However, for rhetorical purposes, the language user also has licence to present punctual-like events as if they take time. To do this, progressive viewpoint aspect is used.

So, arguing about the physical realisation of events in the world misses the point of Vendler's and others' classifications: these classifications are relative to the patterning and interpretation of expressions in natural language. A theory which aims to model events as described by natural language should contain identifiable categories with respect to their linguistic behaviour. For example, what temporal adverbials the verb describing an event can occur with: *at*- vs *for*-adverbials; or what viewpoint aspects the verb can appear in. This is how I have motivated the category distinctions in section 4.2.1, and the same approach will also be followed in this section.

In this section, three main motivations are given for suggesting that, despite the fact that culminations are usually perceived as occurring instantaneously, in certain contexts a durative structure is needed. The motivations are that:

1. some culminations pattern with the progressive in English and imperfective in Russian
2. some culminations pattern with *start*, implying that following the start of the event there is some duration before it is completed; and
3. the two event nuclei that Moens (1987: 108–9) offers for some culminations, eg *the bomb exploded*, can be brought together into one representation of a culmination with internal structure.

To account for the fact that some culminations can be perceived as having duration, I extend the template for culmination expressions proposed in Chapter 2. I propose a second level of representation which exposes the internal structure of culminations, effectively 'opening it up' and reflecting the possibility of perceiving such

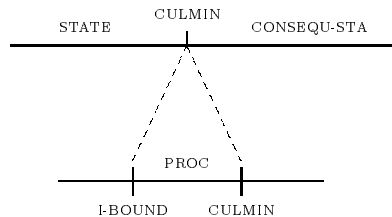


Figure 4.1: Proposal for the internal structure of culminations, depicted diagrammatically

events as having duration. The proposed second level of representation is depicted diagrammatically in Figure 4.1 (and is represented in terms of feature structures in section 4.3). This extended event template is distinguished from that for culminated processes, but the underlying structure does in fact contain the same event phases, albeit represented at a different level in the template. The primary representation of culmination expressions is still the single event phase: the CULMIN-phase, and this preserves the perceived instantaneity of events which categorise as culminations. The secondary level of structure reflects the dramatic, rhetorical kind of effect that ‘zooming in’ or ‘focusing in’ on the internal structure of culmination expressions conveys. This is not possible for all culmination expressions (nor all contexts), and therefore not all culminations allow the internal structure to be exposed (ie, not all culminations are felicitous in the progressive aspect). That is in contrast with culminated process expressions which are always perceived as having some duration, even if in the real world the event does in fact take a very short time to occur.

Not all culminations take the progressive, at least not in all contexts. This suggests that not all culminations allow access to the internal structure, so access to the second level should be blocked for certain culminations or certain contexts. Since the contexts are pragmatically determined, and are often dependent on rhetorical factors, I do not specify precisely what those contexts are. In section 4.3 I provide a representation which can accommodate those references to culminations which do require internal structure. For those contexts in which the internal structure cannot be accessed, the secondary level of representation is simply not available.

#### 4.2.2.1 Culminations and the progressive

For sentences in the simple aspect, it is the whole of the template for the referred-to event which is explicitly described. For culmination expressions, it is the event phase CULMIN which is explicitly described. Culminations do, however, sometimes pattern with the progressive, although the reading is often perceived as being marked in some way: a special context is needed where, for example, the event which is

usually perceived as instantaneous is perceived as taking time, or where the event is backgrounded to another event.

In the literature (eg, Comrie 1976, Dowty 1986), there is a variety of opinion on the acceptability of culmination expressions with the progressive aspect (or imperfective in Russian); there is certainly an intuition that such constructions are less readily available than, say, the progressive of culminated process expressions.

Comrie explicitly states that achievements (ie, culminations) preclude the use of “specifically imperfective forms” and continues that, therefore, (4.33a) is not felicitous but that (4.33b), for instance, is (Comrie 1976: 47).

- (4.33) a. \*John was reaching the summit when he died.  
(starred by Comrie, but probably marginally acceptable)  
b. John had almost reached the summit when he died.

I would argue that (4.33a) is acceptable, and that the interpretation for that vs (4.33b) is slightly different. (4.33a) is probably better if the *when*-clause and main clause are exchanged. Other examples are given at (4.36). The differences in interpretation between will be drawn out in this chapter.

Dowty (1986), on the other hand, notes that *some* achievements (ie culminations) *can* take the progressive. Note, though, that this is also a revision on his earlier position (Dowty 1979) where he claimed that culminations do not pattern with this construction (and offered this as a test for aspectual class).

In Russian, constructions in the imperfective can have a multiple, or iterated, event reading, as well as explicitly describing the PROC-phase of a template for a single event reference. For durative expressions, there is not a strong preference for one reading over the other; the context usually determines which is appropriate. For culmination expressions though, there is a strong preference for a multiple event reading, since culminations cannot normally be perceived as taking time.

- (4.34) Ona vhidila na stsenu i (po doroge) otdala tsvety ne tomu  
she go-onto(IMP) onto stage and (on way) gave flowers not that-DAT  
cheloveku.  
person-DAT  
‘As she went up onto the stage, she gave the flowers to the wrong person.’

For example, (4.34) is an example of a CULMIN-expression in the imperfective which native speakers of Russian interpret as referring to a series of events of going onto a stage, until the second clause is processed and *po doroge* (‘on the way’) indicates that it is the progress of a single event which is being referred to in that context. There is a strong propensity for a multiple reading because the main verb is a culmination expression in the imperfective, but given the right context this can be overridden. Aspectual verbs like *nachinat’/nachat’* (‘to start’) pattern as culmination expressions, and in the imperfective it is easier to interpret them as referring to a single event, for example *nachinal pisat’ pis’mo* (‘was starting to write the letter’). (See Chapter 5 for details of the interpretation of aspectual verbs.)



(4.35) a. When John looked out of the window, the taxi was arriving. Overlap  
 b. When John look out of the window, the taxi arrived. Temporal precedence

(4.36) a. As John reached the summit, he pulled out the flag. Overlap  
 b. As John was reaching the summit, he pulled out the flag. Overlap plus 'dramatic effect'  
 c. As John was reaching the summit, he collapsed with exhaustion.

(4.37) \*John was noticing the painting.  
(4.38) \*John was realising the answer to the problem.

(4.39) The taxi was driving to John's.  
   ↗ The taxi arrived/was arriving at John's.  
   (First sentence: time before John's arrival)

(4.40) John was climbing the mountain, (but didn't reach the summit).  
   ↗ John was reaching the summit  
   (First sentence: time before reaching the summit)

(4.41) John was reaching the summit.

(4.42) John had been climbing the mountain for days. At long last he was reaching the summit.

Smith talks of achievements as being “conceptually detached from any associated process”, but that “a number of them actually allow preliminary stages” (Smith 1991: 61). She cites the example of winning a race which requires running the race, and reaching a summit which implies an event of approaching it. In each of these cases, Smith describes the preliminary stages by a different verb, and I would suggest an analysis in line with the one just proposed where a culminated process infers a related culmination expression by world knowledge, corresponding to the CULMIN-phase of the event template of the culminated process is linked to a culmination by world knowledge.

The aspectual verb *start* is usually felicitous with verbal complements referring to durative events, but is also felicitous with some culmination expressions as its complement. For example,

- (4.43) The taxi started to arrive.  
 (4.44) At last John started to reach the summit.  
 (4.45) John started to enter the shop.

However, culminations do not always pattern with *start*, and these usually coincide with those which do not pattern with progressives, suggesting that there are some culmination expressions for which it is consistently difficult to find a context in which the internal structure of the event can be explicitly described.

- (4.46) \*John started to notice the pen.  
 (4.47) ??John started to realise what the answer was.

For these types of culminations, access to the internal structure is simply blocked, and only the interpretation offered in Chapter 3 is permitted.<sup>3</sup> For culminations which can focus on the internal structure with the progressive or with *start*, a **PROC**-phase and **I-BOUND**-phase is available, and this is embedded in the event template for culmination expressions. This is represented in terms of feature structures in section 4.3.

With a plural subject or object noun phrase, culminations are always felicitous with the aspectual verbs. This is because the plural noun phrases induces an iterative reading, the culmination expression would be coerced into an iterated process expression (ie, a durative expression), and the aspectual verbs explicitly describe the relevant bound of that iterated process.<sup>4</sup> For example,

- (4.48) The taxis started to arrive.  
 (4.49) At last the climbers started to reach the summit [ie, one-by-one].  
 (4.50) John started to notice the pens hidden in different parts of the room.

*Finish* is marginally acceptable with come culminations, and explicitly describes the **CULMIN**-phase of the internal structure.

- (4.51) ?John finished reaching the summit.

<sup>3</sup>This is also, in fact, the case for all culmination expressions in German. Each of the aspectual classes in Chapter 2 can be identified in German, including a distinction between culminations and culminated processes. Also, the ongoing nature of durative events can be expressed, either by the simple past (which is ambiguous between the completive and ongoing reading), or by a nominal phrase, eg *Er war am Schreiben des Briefes* 'He was at-the writing of-the letter 'He was writing the letter'. However, culmination expressions cannot have this reading, suggesting that the internal structure is not available at all in German. Thanks to Frank Schilder for clarifying this point.

<sup>4</sup>This corresponds to the coercion given in (3.30); these examples showing how plural noun phrases induce a coercion. Possible ways of accounting for iterated processes were discussed in section 3.6.1.1.

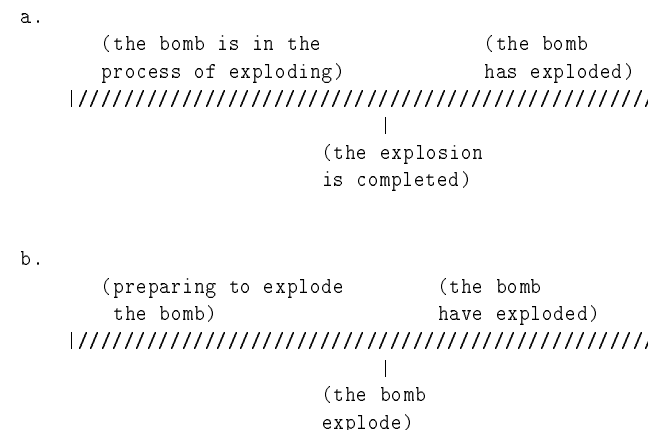


Figure 4.2: Moens' two nuclei representing the event structures corresponding to *bomb explode* (Moens 1987:108–9)

- (4.52) ??John finished entering the shop.

This, however, marks the successful completion of the event, and equates with the primary **CULMIN**-phase (referring to the whole of the event), which is described by the use of the simple aspect, and the use of the simple past is preferred. So, while *John finished reaching the summit* is acceptable, *John reached the summit* is preferable.

#### 4.2.2.3 Extending Moens tripartite event nucleus

Moens (1987) claims that in cases where culminations combine with *when*, they map into a culminated process expressions (relating to his tripartite event nucleus), but that the resulting nucleus can be of two different types. The choice between the two nuclei is presumably dependent on world knowledge. Comparing the two proposed nuclei, exemplified by the phrase *bomb explode* (given in Figure 4.2), it is possible to see how they can be combined to reflect the structure of the proposed template for culminations with an internal structure.

Taking Moens' example of a bomb's explosion (a culmination expression), the **CULMIN**-phase referring to the whole event is explicitly described by

- (4.53) The bomb exploded.

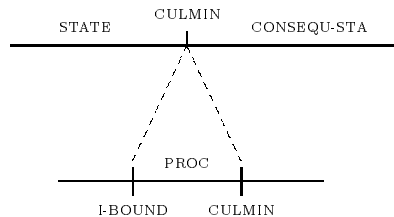


Figure 4.3: Proposal for the internal structure of culminations, depicted diagrammatically, repeated from Figure 4.1

The progressive aspect is defined as explicitly describing a **PROC**-phase; so

(4.54) The bomb was exploding.

refers to the **PROC**-phase in Figure 4.3. This corresponds to Moens' 'bomb is in the process of exploding' (Figure 4.2a), completed by reference to the **CULMIN**-phase with

(4.55) The bomb finished exploding.

Moens' 'preparing to explode the bomb' (Figure 4.2b) refers to the state before the **I-BOUND** of the culmination. His preparatory process phase corresponds to the state prior to a culmination (as shown here)<sup>5</sup>

An alternative representation for the representations given in Figure 4.2 which links these two nuclei offered by Moens, is given by my proposed two-level representation for culminations in Figure 4.3. This alternative representation gives a clearer indication of exactly what each part of Moens' nucleus stands for, and what sentences in English can explicitly describe these phases.

In my representation, there is a proposed one-to-one mapping between the viewpoint aspect of the sentence and what phase or phases are explicitly described by that event reference. For culminations in the simple aspect in English (and perfective aspect in Russian), the whole of the event template is explicitly described; for the perfect in English (and also perfective in Russian), part of the **CONSEQU-ST**-phase is explicitly described; for those in the progressive (or imperfective in Russian) only part of the **PROC**-phase is explicitly described, accessing (in the case of culmination expressions) the secondary level of representation and indicating an 'opened-up' culmination. Thus, the same interpretation is given for the progressive and imperfective, independent of the aspectual class of the sentence: single event references in

<sup>5</sup>If the event reference were a culminated process, it would be the **PROC**-phase prior to the **CULMIN**-phases.

the progressive and imperfective 'seek' a **PROC**-phase. However, the differences in interpretation of the progressive are maintained: for culmination expressions, the use of the progressive is less common than that for durative expressions. This is reflected by restricting access to the internal structure of culminations to certain culmination expressions, or certain contexts.

### 4.3 Event templates for culminations

In section 4.2, I motivated the treatment of culmination expressions both as point events and as events with duration. In section 2.5 of Chapter 2 I gave a feature structure representation of culmination expressions with a single **CULMIN**-phase, and this is repeated in Figure 4.4. In this section I show how this feature structure can be extended to reflect the internal structure of culminations, while preserving the possibility of interpreting culminations as point events. In this way, the diagrammatic representation of the internal structure of culminations given in Figure 4.3 is incorporated into the feature structure representation. In sections 4.3.1 and 4.3.2, I show how culminations in the progressive and culminations with *start* can be interpreted using the feature structures developed here.

The event template for the base form of culmination expressions as motivated in Chapter 2 consists of the single path:

(4.56) [EV-STR|CULMIN|OCCURRENCE-OF □]

where □ is token identical with the values of **INFON** for the culmination's event. The feature structure for the base form of the culmination expression *arrive* is given in Figure 4.4. This differs from the template for culminated processes for which the feature **EV-STR** has three values, representing the three event phases **I-BOUND**, **PROC** and **CULMIN**.

However, when culminations are described with the progressive, the event is described as a durative event, and it is the event in progress that is being described. The event phase **CULMIN** is a punctual phase, and can not be referred to by the progressive, because a progressive always selects for a **PROC**-phase in the template. This is determined by the interpretation of the present participle in English, represented as a lexical rule in Figure 3.9 on page 93. For this rule to apply, the event template must contain at least the following path: [EV-STR|PROC]. Therefore, as the lexical rule stands, a present participle form could not be derived from a culmination expression.

In section 4.2.2, I motivated the need for giving **CULMIN** internal structure and indicated how this could be represented in Figure 4.3. The template representing this internal structure consists of an **I-BOUND**-, **PROC**- and **CULMIN**-phase, like the template for culminated processes. Adding this structure as an internal structure for culminations, subordinate to the main **CULMIN**-phase, produces a representation which looks very similar to that for culminated processes while maintaining the intuition that culminations can describe events perceived as punctual. I propose

representing this internal structure as a feature **EV-STR** which is one of the values of **EV-STR|CULMIN**, thus embedding the 'opened-up structure' for culmination expressions as subordinate to the primary interpretation, showing that this structure represents the **CULMIN**-phase. Taking *arrive* to exemplify, the resulting feature structure representation for culminations with internal structure is shown in Figure 4.5.

The present participle in English explicitly describes part of the **PROC**-phase which is itself a subpart of the **CULMIN**-phase, capturing the intuition that it is the culmination event which is in progress, rather than a time before the event took place.

The tests for distinguishing aspectual classes rely on intuitions about what tenses, viewpoint aspects and aspectual adverbials can be used with each class. In section 4.2, I argued that only certain culminations allow the internal structure to be explicitly described—and often only in certain contexts. A restriction therefore needs to be placed on when this internal structure is available for reference—and this contrasts with culminated process and process expressions for which the whole of the template is always available for explicit reference. This could be expressed as a contextual constraint, but I do not provide these explicit constraints, since I have not developed a model to represent pragmatic context. However, I have given an indication of the sorts of examples in which the progressive can be used with culminations in English. I have also indicated that there are some examples of the use of the imperfective in Russian with culminations which refer to single instances of events.

Having shown how the internal structure of culminations can be represented in terms of feature structures, in the following section I show how it can be used in the interpretation of culminations in the progressive (section 4.3.1) and the interpretation of culminations with *start* (section 4.3.2).

### 4.3.1 Interpretation of culminations in the progressive

In this section I motivate a revised lexical rule to derive the present participle. Having motivated the template for culminations with internal structure, there is now a **PROC**-phase which can be explicitly described by the English progressive (and imperfective in Russian). However, there is a technical problem in applying the lexical rule for the present participle (given in Figure 3.9). The base form of the verb must have a value of content which is at least as follows:

$$(4.57) \quad [\text{CONTENT|EV-STR|PROC}]$$

The path to the **PROC**-phase for culmination expressions is longer than this:

$$(4.58) \quad [\text{CONTENT|EV-STR|CULMIN|EV-STR|PROC}]$$

Therefore, from the base form of *arrive*, the present participle form could not be derived. Factoring out the common features between (4.57) and (4.58), produces the following:

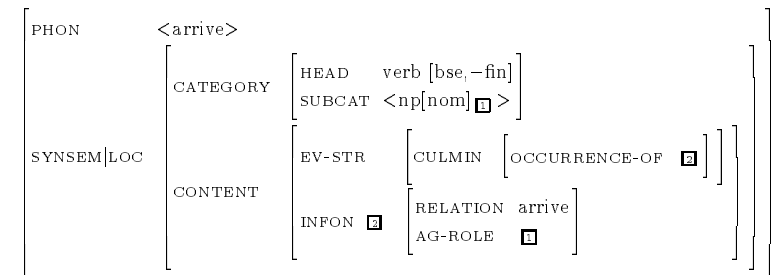


Figure 4.4: Feature structure for the culmination expression *arrive*

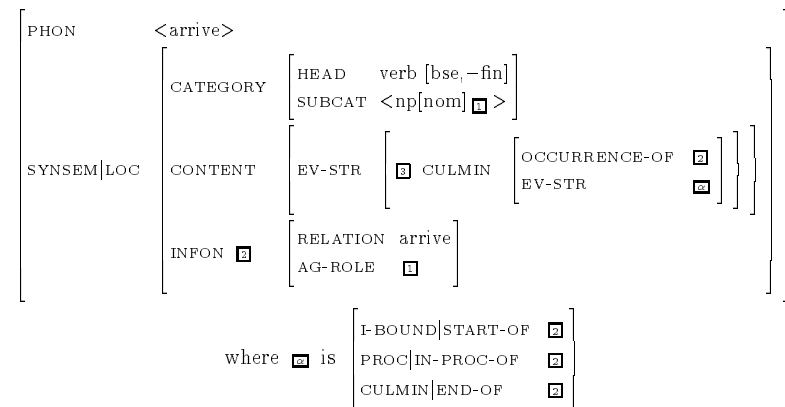
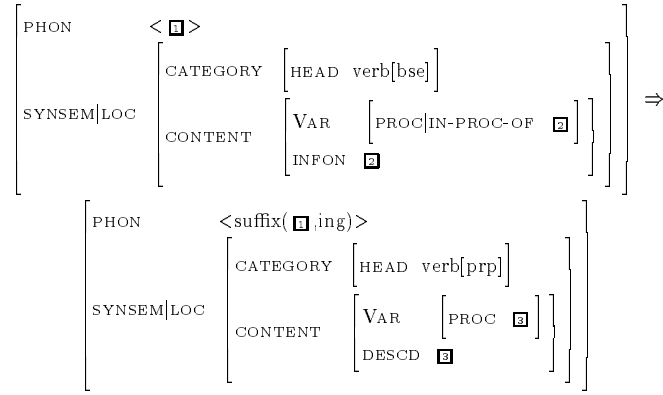


Figure 4.5: Feature structure for culmination expressions, showing internal structure



where VAR stands for either [EV-STR] or [EV-STR|CULMIN|EV-STR]

Figure 4.6: Lexical rule to derive the present participle form from the base form of a verb, modified to apply to culmination expressions as well as durative expressions.

(4.59) [CONTENT|VAR|PROC]

where VAR corresponds to either [EV-STR] or [EV-STR|CULMIN|EV-STR].<sup>6</sup>

I therefore propose a new lexical rule for the present participle, given in Figure 4.6, where VAR replaces the features EV-STR on both sides of the rule, and VAR corresponds to the values given.

With this new lexical rule, the present participle can be derived from culmination expression in English, and an analysis can then be derived for sentences like *John was arriving* and *John was reaching the summit* in the same way as other sentences in the progressive are derived. A tree showing the interpretation of *John was reaching the summit* is given in Figure 4.7

<sup>6</sup>The latter value of VAR is, in fact, further restricted, since CULMIN must also contain the value OCCURRENCE-OF, indicating that this is a culmination expression rather than the CULMIN-phase of a culminated process expression which would have the value FINISH-OF. Therefore VAR corresponds

to [EV-STR] or CONTENT|EV-STR|CULMIN  $\left[ \begin{array}{c} \text{OCC-OF } \boxed{a} \\ \text{EV-STR} \left[ \begin{array}{c} \text{PROC } \boxed{a} \text{ IN-PROC-OF } \boxed{a} \end{array} \right] \end{array} \right]$

where  $\boxed{a}$  is the value of INFON of the event referred to, and  $\boxed{a}$  is the value of DESCD. This is an issue which would need resolving when implementing such a representation.

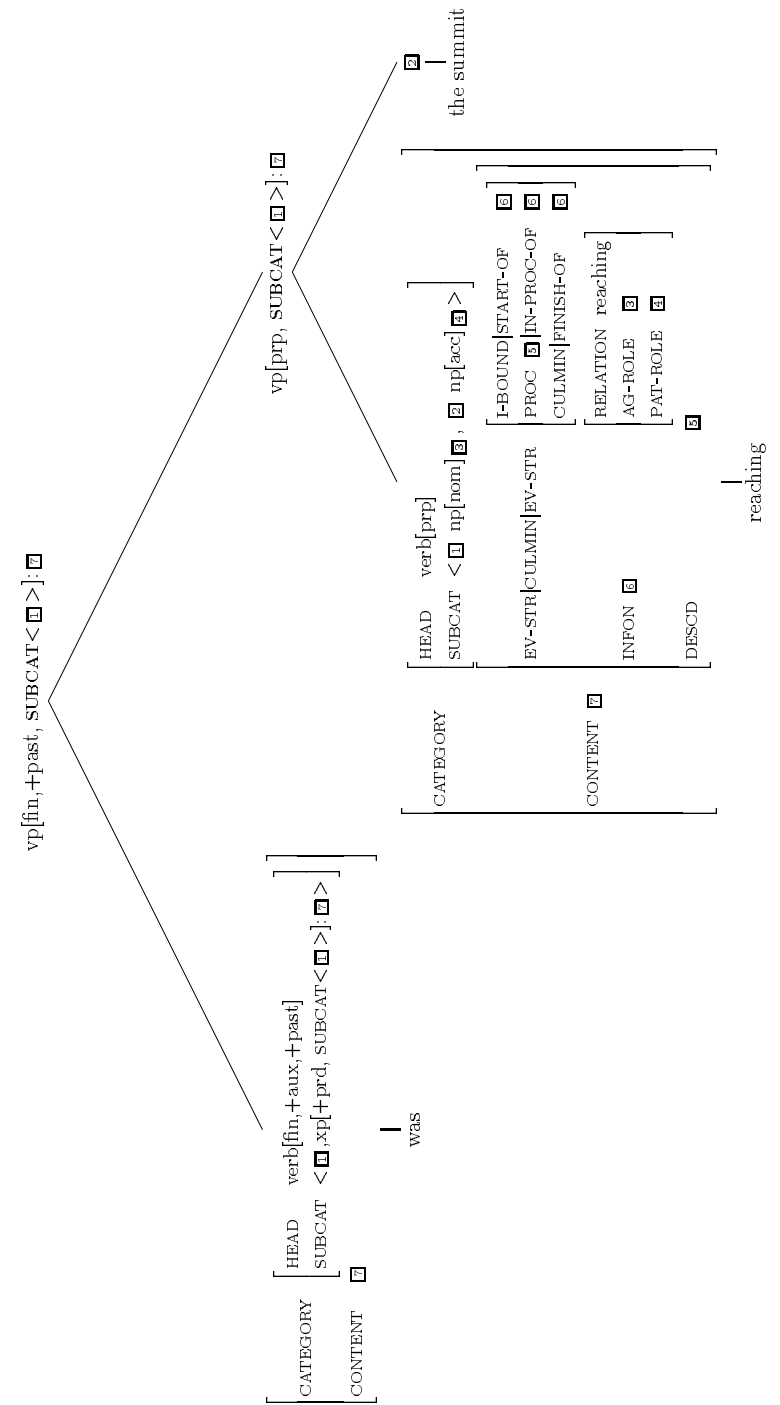


Figure 4.7: Tree for *was reaching the summit*

### 4.3.2 Interpretation of culminations with *start*

In section 4.2.2.2, examples were given of aspectual verbs (*start* and *finish*) with culmination expressions where, for example, *John started reaching the summit* would break down a usually instantaneous event and present the beginning part of it for, say, dramatic effect. What is explicitly described is the beginning of the event, ie the I-BOUND-phase. Since culmination expressions have an internal structure, there is now an I-BOUND phase available to be described by, for example, the aspectual verb *start*, and an analysis can be given in which *start* explicitly describes this phase. A detailed analysis of a variety of aspectual verbs with verbal complements of different aspectual classes (including culminations) is developed in Chapter 5.

## 4.4 Inferencing between events

In this section, additional motivation is given for treating culminations as instantaneous events with internal structure.

So far, I have claimed that there is an event template associated with any given sentence which represents the internal structure of the event referred to, and corresponds to the event's aspectual class. In this section, I shall discuss how inferences can be made about the relationship between, for example, the end of a culminated process expression and a culmination expression which refers to the end of that event. In sections 4.1 and 4.2.2.1, I have already mentioned the relationship between a *climbing-a-mountain*-event and a *reaching-the-summit*-event. Returning to such examples, it is possible to see that culmination expressions often refer to certain bounds of durative expressions. A *reaching-the-summit*-event can explicitly describes the CULMIN-phase of a *climbing-a-mountain*-event, assuming the contextual conditions confirm that the summit is that of the mountain climbed. Of course, there are other ways of reaching summits of mountains (by parachute, or helicopter, for instance).

In a discourse of more than one sentence, inferences between events referred to in different sentences can usually be drawn. A discourse can be said to be coherent if a valid inference can be drawn between such event references. I have not discussed any rules of discourse interpretation, having concentrated on developing an event ontology and analysis which reflects the aspectual interpretation of individual sentences. A theory of discourse interpretation would specify what kinds of temporal and discourse relationships hold between events, and various attempts have been made to do this. Given the analysis presented in this thesis, it turns out that the interaction of the event templates often reflects the relationship holding between events in two sentences.

- (4.60) John was climbing the mountain. He reached the summit [of the mountain] at 2 o'clock.

In (4.60), the first sentence refers to a culminated process expression, explicitly describing part of the PROC-phase. The culminated process finishes with a CULMIN-phase, indicating the culmination of climbing a particular mountain. The second

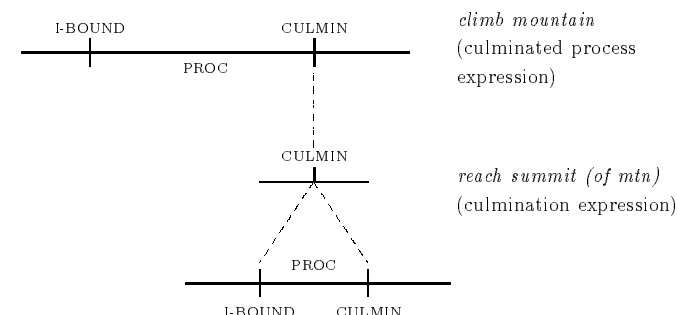


Figure 4.8: Sketch showing the relationship between the event references in (4.60)

sentence explicitly describes the reaching of a summit (and by inference the summit of the same mountain). *Reach the summit* is a culmination expression, represented by a CULMIN-phase. A relationship between these two CULMIN-phase can be inferred, and this indicates that the discourse is coherent. The inference can be made from world knowledge about *climbing-mountain*-events and *reach-summit*-events.

- (4.61) John was reaching the summit.

- (4.62) John was climbing the mountain.

Additionally, this interaction between different event references can be formalised in the representation, and further inferences noted earlier can also be shown to hold in the interpretation. For example, I suggested that (4.61) explicitly describes the very final stages of a climb (assuming he's reached it by climbing, of course). (4.62) explicitly describes a longer period, stretching back to the start of the climb. My analysis of culminations in the progressive gives an interpretation where (4.61) does not extend back through the whole of the climbing event, but only indicates the latter part. These relationships are indicated diagrammatically in Figure 4.8. The representation of culmination expressions (eg, *reach the summit*) as instantaneous allows the link to be made between that event and the instantaneous endpoint (the CULMIN-phase) which is part of the representation of the culminated process expression (eg, *climb the mountain*).

There is also an intuitive relationship between the following pairs of sentences.

- (4.63) a. John burst into laughter.  
b. John laughed/John was laughing.

*Bursting into laughter* is a culmination expression which explicitly describes the start of a *laughing*-event (a process). The start of a process expression is indicated

by an I-BOUND-phase in the event template, and this can be linked with the CULMIN-phase of the event template for *bursting into laughter*.

The links exemplified here are made on the basis of world knowledge about the events referred to, and are therefore pragmatic links. There are, however, pairs of examples where there is a more transparent relationship between the pairs. For example, aspectual verbs like *start* and *stop* refer to certain bounds of their complement verb. For example, *John started laughing* explicitly describes the I-BOUND-phase of the process expression referred to in *John laughed*. Aspectual verbs will be the subject of Chapter 5, in which a similar approach will be taken to the approach in this section, but a complete feature structure interpretation will be given for the examples.

For (4.63), there is also a parallel pair for Russian, where the inceptive is marked by a prefix *za-*: compare *zasmeyat'sya* ('to start laughing') and *smeyat'sya* ('to laugh'). The *za-* prefix in Russian is reasonably productive as an inceptive marker; the semantic interpretation of this prefix will also be discussed in Chapter 5.

Thus, links between templates are made on various levels: morphological (eg, Russian prefix *za-*), syntactic (eg, *start* in *start to laugh*) and pragmatic (eg, 4.60 and 4.63). The net effect is that a conceptual link can be made between certain events. In the final chapter, I shall continue to give interpretations for individual sentences, developing an analysis for aspectual verbs, rather than pursuing the question of how the feature structure analysis could be extended to deal with discourse interpretation.

## 4.5 Conclusions

In this chapter, I have motivated culminations both as instantaneous events and ones which can have duration in certain contexts. I motivated an extended representation of culminations which includes an internal structure. This employs the same event phases as those used in Chapter 2, allowing a comparison between different types of aspectual classes, and highlighting the relationship between culmination expressions and culminated process expressions. The internal structure for culminations was cast as an embedded feature structure within the feature representation for the CULMIN-phase, allowing for reference to culmination expressions as both instantaneous and durative events. This allowed an account for culminations in the progressive (in English) and imperfective (in Russian) to be developed, requiring a revision of the present participle lexical rule. This revision does not alter the interpretations given for culmination expressions in Chapter 3, and additionally provides an interpretation of culminations in the progressive and imperfective, whereby part of a PROC-phase is explicitly described. This is the same interpretation as that given for culminated process and process expressions, and in that way a general uniform interpretation of the imperfective is offered for each of the aspectual classes considered. The underlying structure of the event phases is different for each of the aspectual classes, and therefore the imperfective has a different nuance of interpretation for each of these classes.

In the final section, I sketched out how certain inferences can be drawn by compar-

ing the representations for related culmination and culminated process expressions. Such inferences might be incorporated into a theory of discourse interpretation to determine whether or not a series of sentences forms a coherent discourse. In Chapter 5, I keep the analysis on the sentence level and demonstrate how the analysis of another aspectual phenomenon, that of aspectual verbs, can now be captured within this framework, given the ontology presented up to now. The incorporation of aspectual verbs into the analysis leads to further observations about inferences between events references in a series of sentences.

# Chapter 5

## Aspectual Verbs

### 5.1 Introduction

In this chapter, I propose a treatment of aspectual verbs such as *start*, *begin*, *stop*, *finish*, *resume* and *continue* in which the relationship between the events referred to by the aspectual verb and the verbal complement is marked out in terms of what phases of the event templates for each of these event references are explicitly described (indicated by the value of DESC<sub>D</sub>).

Up to now, I have shown how event templates reflect the aspectual class of a given sentence, and how they provide detailed enough information about the composite phases of an event to give a uniform treatment of viewpoint aspect. In this chapter, I show how the analysis extends straightforwardly to a different aspectual phenomenon, namely aspectual verbs.

Aspectual verbs subcategorise for a complement verb phrase, either a gerund or infinitive, and like other verb phrases, they contain a value for CONTENT|EV-STR indicating the aspectual class of the verb which is referred to. Aspectual verbs explicitly describe one of the event phases of this event structure. For example, *John started writing the letter* explicitly describes the beginning of a *letter-writing*-event, ie the I-BOUND-phase of the template for *write* is explicitly described. *Start* patterns as a culmination expression, and is therefore represented with an event structure of value [CULMIN|OCCURRENCE-OF  $\square$ ] where  $\square$  is token identical with the values of INFON for *start*. Since this culmination expression also describes the I-BOUND-phase of the *writing*-event, [START-OF  $\square$ ] is also a value of CULMIN, where  $\square$  is token identical with the values of INFON for *write*.

The subcategorisation frame for *start*, and other aspectual verbs, will be given, to show how this interpretation for aspectual verbs can be made within the HPSG framework. The interrelationship between the event phases is built up in a principled way to show how, for example, a *finishing*-event is related to the CULMIN-phase of a culminated process expression.

Aspectual verbs, as instantaneous culmination expressions, explicitly describe the bounds of durative events. These bounds are usually taken to describe instantaneous changes of state (from an event not taking place to it being in progress, or from it

being in progress to it not taking place, etc), and as such the aspectual verb marks a change of state. However, in Chapter 4, I motivated a representation for culmination expressions which could reveal a secondary internal structure, and this allows such changes of state to be expressed as if they have duration, if the context allows. The extension of the analysis in this chapter to aspectual verbs provides further motivation for treating culmination expressions as instantaneous with the possibility of exposing internal structure.

The analysis of aspectual verbs shows firstly that viewpoint aspect is not the sole means by which a part of an event can be explicitly described. Secondly, the same use of information sharing between constituent parts of a sentence is employed as in the previous chapters to facilitate the interpretation of aspectual verbs. In this way, Smith's two-component analysis which identifies separate aspectual categories (aspectual class and viewpoint aspect) where one focuses on part of the other is extended to show what other parts of the event structure can be focused on. The interpretations are, again, constructed from the base forms of the verbs, showing the syntactic structure of the sentences and how aspectual information is passed up the tree.

Thirdly, in English and Russian there are aspectual verbs which explicitly describe all of the event phases motivated for the aspectual classes in these languages. Examples are given in Figure 5.1. No new event phases need to be introduced to account for aspectual verbs, and the fact that these event phases are employed in the analysis provides further motivation for them in a linguistic analysis. Event reference is central to the interpretation of aspect expressed in a sentence in terms of aspectual class and viewpoint aspect, and the event phases were motivated for that purpose. Their use to interpret aspectual verbs follows on quite straightforwardly from that analysis.

In this chapter examples of aspectual verbs are given from both English and Russian. Russian also has prefixed perfective forms of verbs which carry aspectual interpretations parallel to aspectual verbs. For example, *zaplakat'* ('to cry-INCEP') meaning 'to start crying' can also be expressed in Russian with the aspectual verb *nachat'* ('to cry'): *nachat' plakat'* ('to start crying'). Such prefixed perfectives are the procedural meanings, identified in section 2.2.3.4. An interpretation is given for

English	Russian	phase
start/begin	nachat'/nachinat'	I-BOUND
stop	perestat'/perestavat'	F-BOUND
finish	konchit'/konchat'	CULMIN (of a CP expression)
continue	prodolzhat' (IMP)	PROC
resume	prodolzhit' (PERF)	I-BOUND <sup>1</sup>

Figure 5.1: Aspectual verbs and the event phases of the verbal complement which each of them explicitly describe



these forms which have parallel interpretations to the aspectual verbs. Their interpretation requires a lexical rule for a class of verbs which has a prefix carrying the specified meaning, and again, the reference to event phases is central to the representation. These representations are compared with the aspectual verb counterparts.

Aspectual verbs can be used with different viewpoint aspects. The initial representations are given in the simple in English and perfective in Russian. As culmination expressions, the use of the progressive is restricted to certain contexts. However, the analysis from Chapter 4 can be applied to aspectual verbs, exposing the internal structure of the culmination. Aspectual verbs can also be used in the perfect aspect, and interpretations will be given for such examples.

Similarly, in Russian, if there is an imperfective counterpart for the aspectual verb, an interpretation of viewpoint aspect can be given following the same principles as those used in preceding chapters. Most procedural forms are derived perfective forms from the base form, which are secondary to the main perfective which explicitly describes the completion of the whole event. The procedural forms do not usually have a corresponding imperfective, but this is not unexpected since these forms are explicitly describing instantaneous event phases, which do not usually have an 'opened up' interpretation in Russian.

Before developing the analysis from previous chapters for aspectual verbs, I shall review some other approaches to aspectual verbs.

## 5.2 Approaches to aspectual verbs

### 5.2.1 Freed 1979

Freed (1979) provides a comprehensive treatment of aspectual verbs. She proposes a number of time segments of intervals which correspond to parts of an event, and language users refer to these intervals when they describe various stages of that event. The basic segmented event consists of the time segments onset, nucleus, and coda. Each of these is related temporally to the others and Freed points out that "it is sometimes difficult to draw a strict line of demarcation between them, hence the slippery nature of the verbs that characterize these different time periods" (Freed 1979: 30). Freed depicts the structure of the time segments diagrammatically as shown in Figure 5.2, and indicates that sentences of certain forms refer to certain parts of this structure.

For example, she gives conditions which must hold for particular segments to be referred to.

- (5.1) "*NP be<sub>prog</sub> VP* names an event which has an onset (and no coda) if and only if on a time interval  $t_1$ , there is an earliest interval  $t_0$  of  $t_1$  such that *NP be<sub>prog</sub> VP* is not true during  $t_0$  but is true during  $t_1 - t_0$  (and at subintervals of  $t_1 - t_0$ )" (Freed 1979: 38)

(5.1) gives the conditions for referring to the period following the onset segment, and Freed continues with examples of what linguistic forms refer to this segment.

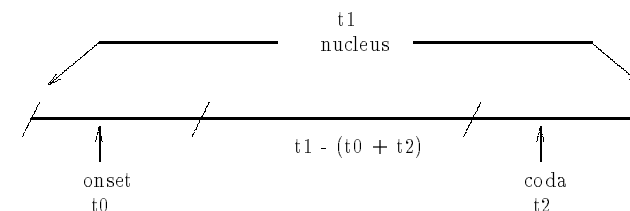


Figure 5.2: Freed's temporal segments represented as intervals

She uses the present progressive in her examples. For example, *Lillian is sneezing* has an onset ( $t_0$ ) "such that [the sentence] *Lillian is sneezing* is not during  $t_0$ , and *Lillian is sneezing* is true during  $t_1 - t_0$ ." So, the onset cannot be described by the present progressive. However, "*Lillian is starting to sneeze* is true during  $t_0$ " (Freed 1979: 38). Using similar conditions, Freed states that *Pat is writing a letter* is not true during  $t_2$ , but *Pat is finishing the letter* is true during  $t_2$ .

So, Freed uses the time segments to indicate the temporal relationship between references to events in sentences using the aspectual verbs *finish*, *start*, etc. The progressive refers to the middle segment. She emphasises that the structures are intended to represent the linguistic descriptions, and not physical condition which must exist for real-world events, ie the structures reflect the semantic characteristics of aspectualisers. The aspectual verbs are therefore analysed as referring to particular segments of the structure depicted in Figure 5.2.

Freed does not motivate the elements of the temporal structure according to the kinds of aspectual verbs which can refer to each segment: all the segments are durative, with no indication as to the distinction between, eg, *Pat started writing the letter* and *Pat was starting to write the letter*, where the former is perceived as a point event. As I have shown in previous chapters, some event phases are perceived as being point like and others are perceived as durative, depending on the aspectual class of the verb. I have shown that I-BOUND-, F-BOUND- and CULMIN-phases are usually perceived as indicating an instantaneous change of state in linguistic description, and that the interpretations of these phases should differ from those for PROC-phases.

In this chapter, I shall show that the aspectual verbs which explicitly describe the punctual bounds are culmination expressions, and therefore represent seemingly instantaneous events. In the simple past (in English), the whole of the template is explicitly described, indicating an instantaneous change of state. This justifies the representation of the bounds as punctual phases, as they are in the event templates. However, as was argued in Chapter 4, in certain contexts (eg, when the progressive is acceptable in English) these seemingly punctual events can be presented as having duration. In those cases, the internal structure of culminations can be revealed, allowing the bounds of an event to be presented as having duration.

At this level, the event phases in my representation correspond to the durative nature of Freed's, but I argue that the punctual interpretation is also necessary to reflect the intuitive relationship between the start of a durative event and its progress after it has started. The two-level analysis of culmination expressions also allows a distinction to be drawn between aspectual verbs in the simple aspect and those in the progressive aspect.

The feature structure analysis offered in this chapter therefore provides a more detailed analysis than Freed's, drawing on linguistic data to motivate the nature of the event phases used. The data is measured using the tests for aspectual class introduced in Chapter 2.

### 5.2.2 Smith's 'super-lexical morphemes'

Smith discusses aspectual verbs as marked forms which "shift the focus of a verb constellation", allowing "speakers [to] present situations from a narrowed point of view" (Smith 1991: 75). In that section, she continues that "such morphemes complement the basic-level situation types [ie, aspectual classes], without changing the type of situation involved", concluding that "an account of super-lexical morphemes presents no difficulty in principle for compositional rules". In this chapter I shall present a compositional analysis of aspectual verbs within the HPSG-style framework developed so far.

Examples that Smith gives of lexical forms and morphemes which function in this way are the English main verbs such as *begin*, *start*, *continue* and *stop*, and prefixes in Russian and Navajo, which mark the inception or other parts of events; eg, the Russian procedural *zagovorit'* ('to begin speaking'), derived by the addition of the prefix *za-* from *govorit'* ('to speak'). The super-lexical morphemes effectively leave unaltered the basic meaning of the original verbs, but indicate how the action proceeds or develops (ie, that it starts in the case of *zagovorit'*).

In discussing situation type, Smith points out that aspectual verbs are "Accomplishments if they present a change of state with internal structure, that is, that has a process and an outcome" (Smith 1991: 54), but that they "refer to Achievements when they focus on an initial or final endpoint that is instantaneous" (p. 61). This suggests that aspectual verbs are ambiguous between these two aspectual classes. In this chapter I determine what aspectual class the aspectual verbs belong to. For culmination expressions, the event can be 'opened up', thus distinguishing between instantaneous events and those with internal structure. The aspectual verbs select for a verbal complement which also refers to an event template. I shall also discuss how reference to this interacts with aspectual verbs, demonstrating the relationship between the "shifted situation type" and the "basic-level situation type" in Smith's terms (p. 75).

There is a discrepancy between Freed's and Smith's approaches as to the nature of the event phase which the aspectual verb forms refers to. Freed presents the temporal segments of events as intervals, whereas Smith's initial and final endpoints are presented as instantaneous points, as are my event phases I-BOUND, F-BOUND and CULMIN. In section 5.3, I shall apply Dowty's tests for determining aspectual class

(used in Chapter 2) to demonstrate that aspectual verbs referring to the endpoints of an event template are in fact culmination expressions (corresponding to Smith's and Dowty's Achievements). This categorisation reflects the intuition that the beginning, stopping and finishing of events corresponds to a change of state, either into a durative event (ie, the PROC-phase) for inceptives, or into a state following a durative event. This observation has been made by various authors, including Comrie (1976), Forsyth (1970), and Smith (1991). However, in some contexts, aspectual verbs referring to the bounds of an event appear to have a durative reading, even though they categorise as culmination expressions. Applying the results from Chapter 4 provides a solution to such examples, whereby the internal structure of a CULMIN-phase is exposed.

A distinction must therefore be drawn between the aspectual class of the aspectual verb, and that of the event referred to by those verbs. In that sense, there is a shift of situation type, complementing the "basic-level situation type", which is noted by Smith. In section 5.5, I shall show how the interaction between these two situation types can be captured within the analysis presented in the previous chapters. Structure sharing is used to show the interaction between the event templates of the respective verb phrases. There is no explicit "shift" in aspectual class, but the relationship between the event templates is reflected in the interpretation of the aspectual verbs. Aspectual morphemes in Russian will be derived by a lexical rule, in a similar fashion to the representation for the perfective and imperfective aspect in section 3.5.3 of Chapter 3. Inceptives are exemplified in section 5.5.2.1, and an example of the Russian terminative *dopisat'* ('to finish writing a letter') is given in section 5.5.4.1. In these examples there is an explicit shift in the aspectual class of the verb, but the relationship between that shifted event reference and the base one is clearly shown in the analysis, allowing comparison of interpretation between these examples and those with explicit aspectual verbs.

## 5.3 The aspectual class of the aspectual verbs

Before giving an analysis of aspectual verbs, in this section I demonstrate with linguistic tests that *start*, *finish*, *stop* and *resume* behave as culmination expressions, and discuss whether *continue* is a process or culmination expression. *Continue* refers to the PROC-phase of the subcategorised for VP and so the interpretation is the same for both simple and progressive aspects. Each of the aspectual verbs selects for a durative event (ie, a culminated process or process expression), although they sometimes occur with culmination expressions, in which case the aspectual class coerces to an iterated process expression (eg, *The cars started arriving at 2pm*). I use the same tests as those introduced in Chapter 2 for identifying the aspectual class of a verb or verb phrase.



- (5.9) a. On cherez 10 minut nachal govorit' ob etom.  
He across 10 minutes started(PERF) to talk about it  
'He started talking about it in ten minutes.'  
(period prior to the event)
- b. On cherez 10 minut nachinal govorit' ob etom.  
He across 10 minutes started(IMP) to talk about it  
'He was starting to talk about it in ten minutes.'  
(after 10 minutes he was in the process of starting to talk about it)

### 5.3.2 Aspectual class of *finish* and *stop*

#### 5.3.2.1 Aspectual class of *finish*

Using similar tests to those for *start*, again modelled on the ones in Chapter 2, it can be shown that *finish* is also a culmination expression.

- (5.10) a. John finished writing the letter in a few minutes.  
(time up to the *finishing*-event, ie the final stages of the *writing*-event)
- b. It took John a few minutes to finish writing the letter.  
(ditto)

In (5.10a), the *in*-adverbial refers to the time leading up to the *finishing*-event, suggesting a culmination expression.

In my analysis of aspectual verbs, the relationship between the main verb and the event of the complement clause is made explicit; *finish* will be treated as a culmination expression, which is related to the CULMIN-phase of a culminated process expression referred to by the complement verb (ie, *write* in the above example). If the *in*-adverbial in (5.10a) refers to the time leading up to the *finishing*-event, then there is an inference that for the period of time referred to by the *in*-adverbial refers to a part of the process of writing a letter, and this reflects the intuitions about the interpretation of (5.10a).

Effectively, the time specified by the *in*-adverbial refers to the latter part of the *writing*-event (because it ends with the completion of the letter). The whole of this time period could be considered to be part of a *finishing*-event, ie the latter part of the *writing*-event. In the analysis which follows, the part of the template which is explicitly described is a part of the PROC-phase for the culminated process *write* which leads up to and includes the CULMIN-phase, hence by implication it is the finishing part of the writing event which is explicitly described.

- (5.11) a. John finished writing the letter in two hours  
→ John was writing the letter in those two hours  
↗ John was finishing writing the letter in those two hours, but was finishing writing in the last part of that period
- b. John almost finished writing the letter. not ambiguous
- c. John finished writing the letter at 2pm  
→ *whole of finishing event occurs at 2pm*

(5.11) also pattern as would be expected for culmination.

*Finish* selects for a verbal complement of aspectual class culminated process. It explicitly describes the CULMIN-phase of the template for this complement, since the interpretation of *finish* is that it explicitly describes the end of an event as it culminates. This restriction is demonstrated by the linguistic data: *finish* can combine felicitously with culminated process expressions but not process expressions.

- (5.12) John finished writing the letter. (CP)
- (5.13) a. ??John finished pushing the cart (PROC).  
b. John finished pushing the cart to the station (CP)
- (5.14) a. ?John finished playing in the garden (PROC)  
b. John finished playing the game of patience (CP)

In Russian, *konchit'* (PERF) ('to finish') also behaves like a culmination expression, and the imperfective counterpart (*knochat'*) is available to refer to the internal structure of the culmination expression in certain contexts. This is the same pattern as for *nachinat'/nachat'* ('to start'). The *v*-adverbial with *konchit'* (PERF) indicates that this is a culmination expression, and with *konchat'* (IMP), it is the internal part of the finishing event which is referred to by the punctual adverbial.

- (5.15) a. V 2 chasa on konchil pisat' pis'mo.  
At 2 o'clock he finished(PERF) to write letter  
'At 2 o'clock he finished writing the letter.'
- b. V 2 chasa on konchal pisat' pis'mo.  
At 2 o'clock he finished(IMP) to write letter  
'At 2 o'clock he was finishing writing the letter.'
- (5.16) a. \* On 10 minut konchil govorit' ob etom.  
He 10 minutes finished(PERF) to talk about it  
'He finished talking about it for ten minutes.'
- b. On 10 minut konchal govorit' ob etom.  
He 10 minutes finished(IMP) to talk about it  
'He was finishing talking about it for ten minutes.'  
(referring to internal structure of culmination)

- (5.17) a. On cherez 10 minut konchil govorit' ob etom.  
 He across 10 minutes finished(PERF) to talk about it  
 'He finished talking about it in ten minutes.'  
 (period prior to the event)
- b. On cherez 10 minut konchal govorit' ob etom.  
 He across 10 minutes finished(IMP) to talk about it  
 'He was finishing to talk about it in ten minutes.'

Like English, the Russian counterpart selects for a verbal complement which is a culminated process, and not a process expression.

- (5.18) a. On konchil pisat' pis'mo.  
 He finished(PERF) to write letter (CP)  
 'He finished writing the letter.'
- b. ?? On konchil gulyat' v parku.  
 He finished(PERF) to play in park (PROC)  
 ?? 'He finished walking in the park.'

### 5.3.2.2 Aspectual class of *stop*

*Stop* is also a culmination expression which occurs with a verbal complement which is a durative expression, either a process or culminated process expression. *Stop* explicitly describes an F-BOUND-phase related to that durative event. Details of the analysis will be given in section 5.5.4.4, but in this section, I shall show that *stop* is a culmination expression, modelled on the tests used in Chapter 2.

- (5.19) a. It took John a few minutes to stop writing the letter.  
 b. ??John spent a few minutes stopping writing the letter.  
 c. John stopped writing the letter in two hours  
 ↗ John was stopping writing the letter in those two hours  
 d. John almost stopped writing the letter. not ambiguous  
 e. John stopped writing the letter at 2pm  
 → *whole of stopping event occurs at 2pm*

*For*-adverbials are not normally felicitous with culmination expressions (see (5.20a)). However, for certain culminations, *for*-adverbials are felicitous, for example, (5.20b)–(5.20c), quoted from Hitzeman 1993: 14, and (5.20d)–(5.20e). The temporal span of these adverbials is over the consequent state following the CULMIN-phase, which holds as long as the 'effects' of the event hold.

- (5.20) a. \*John noticed the painting for five minutes.  
 b. John left the room for five minutes.  
 c. The Sheriff jailed Robin Hood for four years.  
 d. John arrived at the hotel for two weeks.  
 e. John stopped writing the letter for five minutes.  
 → John resumed writing the letter after those five minutes.

In Chapter 3, there was a discussion about the nature of consequent states, and that they hold for as long as the completed event has 'current relevance' in the discourse contexts. In the examples (5.20b)–(5.20e), this is the period up to when the culmination event is 'reversed', eg John might return to the room, Robin Hood is released, or John stops renting the hotel room. For (5.20e), there is an intuition that John resumes writing the letter after five minutes, effectively reversing the effect of the *stop*-event, and indicating a relationship between two events of writing, interrupted by a period of not writing. Hitzeman (1993) notes that this is a particular type of *for*-adverbial which refers to the consequent state (in Moens' terms). She uses this example as one of the motivations for recategorising the aspectual classes in her thesis, in order to give a uniform interpretation for temporal adverbials. From my point of view, this reading of the *for*-adverbial is interesting, in that the time span of this adverbial when interpreted with respect to *stop* suggests what the relationship is between two of the aspectual verbs, that is *stop* and *resume* (and *start again*).

Although *stop* ostensibly explicitly describes the F-BOUND-phase of the complement verb's event template, there may also be an element of intention that the event will resume again, particularly when the *for*-adverbial is used. An analysis of temporal adverbials would have to address this issue, as Hitzeman does. For the purposes of the analysis of event structure, it is important to note that there is an inference that another event (ie, *writing*-event in this context) of the same type may take place after that event has stopped. Similarly, this inference can also be drawn for examples in the perfect.

- (5.21) John has stopped writing the letter for five minutes. → John intends to start writing the letter again after those five minutes have elapsed.

In the analysis given in section 5.5.4.4, I point out that these inferences hold, although I do not formalise the relationship between the two events in the representation, since this is an issue for a feature PRAGMATICS. However, there are some inferences which can be clearly drawn from the way the feature structure representation is constructed, and these are discussed in section 5.6.

In the above examples the verbal complement is a culminated process expression in each case. *Stop* also subcategorises for process expressions, as (5.22) show.

- (5.22) a. John stopped playing in the garden.  
 b. John stopped running.

*Stop* explicitly describes the F-BOUND-phase of the verbal complement's event template. Process expressions have an F-BOUND-phase in their template but culminated process expressions do not. However, as long as a culminated process has not reached the CULMIN-phase, it can be interrupted, and this interruption can be described by the aspectual verb *stop*, as (5.23) shows.

- (5.23) John stopped writing the letter, started it again the next day and finished it by noon.

An F-BOUND-phase can occur any time during a PROC-phase, marking the end of this process. If the PROC-phase refers to a culminated process expression, this F-BOUND-phase occurs before the CULMIN-phase, and this constraint must be stipulated as a rule for the ordering of event phases with respect to each other. The aspectual verb *stop* therefore requires its verbal complement to have at least a path EV-STR|PROC. The stopping of that process indicates an F-BOUND-phase, after which the event may be resumed. This restriction on the interaction between event phases will be discussed in section 5.5.5, and a new constraint will be introduced.

Taking parallel examples for Russian, the aspectual class of *perestat'*(PERF) ('to stop') can also be shown to be culmination.

### 5.3.3 Aspectual class of *resume* and *continue*

#### 5.3.3.1 Aspectual class of *resume*, *start again*

Using the same format to demonstrate the aspectual class of *resume* and *start again*, the tests given here indicate that they pattern as culmination expressions.

- (5.24) a. John started writing the letter again in a few minutes.  
 b. In a few minutes, John started writing the letter again.  
 c. John started writing the letter again for a few minutes.  
 d. It took John a few minutes to start writing the letter again.  
 e. ??John spent a few minutes starting to write the letter again.

The examples in (5.24) pattern like other culmination expressions, as do those in (5.25).

- (5.25) a. John started writing the letter again in two hours  
           ↗ John was starting to write the letter again in those two hours  
 b. John almost started writing the letter again.                   not ambiguous  
 c. John started writing the letter again at 2pm  
           → *whole event of resumption occurs at 2pm*  
 d. John had started writing the letter again.  
           → John was writing the letter.

The culmination expressions *start again* or *resume* also have a related event associated with them: there is an implication that an event of the 'same type' as that referred to in the complement clause has already taken place (in part), and stopped, as is illustrated in (5.26). Here 'same type' means that the subject and object noun phrase referents are token identical for each of the events (ie, *John* and *the letter* in these examples) and that the event refers to the same type of expression in the real world.

- (5.26) a. John started writing the letter again.  
           → John had stopped writing the letter (before this).  
 b. In five minutes, John started writing the letter again. → John stopped writing the letter five minutes before starting writing it again.  
 (ie, the *in*-adverbial explicitly describes the time before a culmination expression in the case of *start again* and *resume*, extends back to the time the event stopped. A detailed analysis of *in*-adverbials would identify this span of time.)

The relationship between the two *writing*-events will be assumed to be inferable from the discourse context. The analysis of *start again* and *resume* is therefore the same as for *start* except for this added inference. Since I give interpretations just for single sentences and do not develop a discourse grammar showing the temporal (and other discourse) relationships between described events, I do not provide more detail of how this analysis could be formalised. However, examples of inferences which can be drawn from the analysis and would be required in a discourse analysis are discussed in section 5.6.

The Russian for *resume* is *prodolzhit'*, the perfective counterpart of *prodolzhat'* ('to continue'). *Continue* in English is in fact ambiguous between continuing a process, and resuming doing something, and this ambiguity is resolved by the context of the sentence. I shall give examples for Russian *prodolzhat'*/*prodolzhit'* at the end of section 5.3.3.2

#### 5.3.3.2 Aspectual class of *continue*

*Continue* seems to test both as a culmination expression (referring to the resumption of an event) and also as a process expression (indicating that a durative event is ongoing). The readings vary depending on the temporal adverbials used (exemplified by the tests used here), and other context. *Continue* is therefore felicitous with temporal adverbials which combine with either culmination or process expressions: if an interpretation can be made for either of the aspectual classes then an example with *continue* will be felicitous and the intended reading can usually be discerned from the context. This is in contrast with expressions which pattern, for example, just as culmination expressions, where some of the following examples would not be acceptable. I shall indicate which interpretation is given for each of the examples below.

- (5.27) a. \*John continued writing the letter in a few minutes.  
 b. In a few minutes, John continued writing the letter.  
           (culmination expression, ie resumed after some minutes)  
 c. John continued writing the letter for a few minutes.  
           (process expression, ie ongoing durative event)

The acceptance of (5.27c) is contrary to the tests for culmination expressions, except that the *for*-adverbial could be interpreted as referring to the time following the instance of *continuing*.

(5.28a) would not be acceptable on the process reading, but on the culmination reading (ie, resumption of the event in the complement clause) it is okay. Equally, (5.28b) also indicates a culmination reading for *continue*.

- (5.28) a. It took John an hour to continue writing the letter.  
b. John continued writing the letter at 2pm.

*Continue* seems to behave more frequently as a culmination expression, although it can refer both to the resumption or an event, or the continuing nature of an ongoing event. (5.27c) can indicate that John resumed the letter for a few minutes and stopped again, or that he was already writing it but stopped in a few minutes time. That is to say, the event of *continuing* is an instant and the *for*-adverbial describes the time following that instant, which explicitly describes the progress of the complement verb's event. There is an inference that, if *John continued writing the letter for 10 minutes*, then he stopped writing it after those 10 minutes. By revising the interpretation for (5.27c), I postulate that *continue* can be represented as a culmination expression which refers either to the I-BOUND-phase (of a resumed event), or the PROC-phase of an ongoing event. In the latter, the ongoing nature of the complement verb's event is captured, while the aspectual verb is represented as an instantaneous event, ie *continue* picks out an instance with an event in progress.

Process expressions are normally felicitous with aspectual verbs such as *start* and *stop*, but examples with *continue* sound odd (5.29). This provides more evidence that *continue* should be classed as a culmination expression. However, the progressive is fine (5.30a) because the progress of the complement verb's event is explicitly described; and this example has the same interpretation as (5.30b) which reflects the intuition about its reading.

- (5.29) a. ??John started to continue writing the letter.  
b. ??John stopped continuing to write the letter.  
(5.30) a. John was continuing writing the letter.  
b. John continued to write the letter.

I shall therefore represent *continue* as a culmination expression which refers either to the I-BOUND- or PROC-phase of the complement verbs event template. This is given in section 5.5.6.2.

The following examples for Russian *prodolzhat' / prodolzhit'* demonstrate that the imperfective corresponds to *continue* and explicitly describes a PROC-phase of the complement verb's event template and the perfective corresponds to the culmination expression *resume*, indicating the continuation of an event which was stopped at an earlier time.

- (5.31) a. V 2 chasa on prodolzhal pisat' pis'mo.  
At 2 o'clock he continued(PERF) to write letter

'At 2 o'clock he resumed writing the letter.'

- b. V 2 chasa on prodolzhal pisat' pis'mo.  
At 2 o'clock he continued(IMP) to write letter  
'At 2 o'clock he was continuing writing the letter.'

- (5.32) a. On na 10 minut prodolzhal govorit' ob etom.  
He for 10 minutes continued(PERF) to talk about it  
'He resumed talking about it for ten minutes.'  
b. \* On na 10 minut prodolzhal govorit' ob etom.  
He for 10 minutes continued(IMP) to talk about it  
\* 'He was continuing talking about it for ten minutes.'

## 5.4 Control and raising verbs

Before discussing the semantic analysis of aspectual verbs and what parts of the event templates are explicitly described. In this section I discuss what control relationship aspectual verbs have, ie whether they are raising or control verbs.

Pustejovsky shows that *begin* behaves as either a control or a raising verb (Pustejovsky and Bouillon 1995: 143ff) depending on the complement verb in a particular sentence, noting that this analysis of aspectual verbs was already proposed in 1970 by Perlmutter. A classic test for control verbs is whether they are acceptable as a complement of the verbs *force* or *try*. In (5.33a), *begin writing the thesis* is fine as a complement of *force*, but in (5.33b) *begin raining* is not.

- (5.33) a. Mary forced John to begin writing his thesis.  
b. \*Mary forced it to begin raining yesterday.  
c. \*Mary forced John to begin feeling ill.  
(5.34) a. John tried to begin writing his thesis.  
b. \*It tried to begin raining yesterday.  
c. \*John tried to begin feeling ill.

In (5.33a) the object of *force* stands in a control relation to the complement verb phrase, while (5.33b) is an example of a raising construction. *Begin* is felicitous with either of these verbal complements when it doesn't stand with the verb *force*, as (5.35) shows.

- (5.35) a. John began writing his thesis.  
b. It began to rain.  
c. John began to feel ill.

Some examples of *begin* are fine with *force* (examples of *begin* as a control verb) while others are not (examples of *begin* as a raising verb). Pollard and Sag distinguish between raising and control verbs (Pollard and Sag 1994: 134ff) by indicating for control verbs that the agent of, say, the *begin*-event (John in 5.33a) is also the agent of the *writing*-event. For control verbs, since the agent has control over the *writing*-event, he can be forced to carry out that action. For raising verbs, however, the agents do not have to match. The agent of someone starting to feel ill might be, for example, a bacteria which John does not have control over, and so John cannot be *forced* to feel ill. For control verbs, the control relationship is indicated by specifying that the semantic values for the subject NP of *begin* are the same as those for the subject NP of the subcategorised for VP, and furthermore that the AGENT-ROLE (AG-ROLE) is the same in each case. This is illustrated for *begin* in Figure 5.3.

This is the representation which is developed in the remainder of this chapter with feature values for event templates, and which is modelled on Pollard and Sag 1994: 135.

Raising verbs do not have this agent constraint and there is no semantic dependency between the subject NP and and subcategorised for NP; the constraint is that the syntactic features must be token identical (indicated by  $\square$  in Figure 5.4).

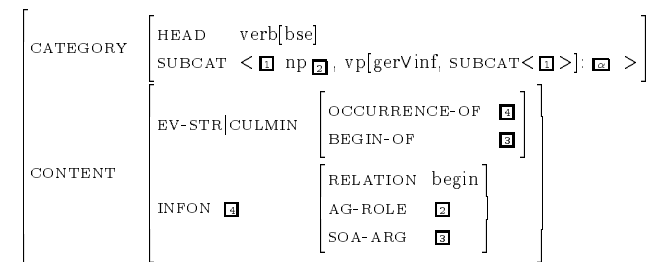
Control and raising verbs also take the feature SOA-ARG (state of affairs argument) as a value of INFON and this refers to the infon of the action referred to by the complement verb phrase.

The distinction between the two types of *begin* in English depends on the complement verb phrase and whether the agent of that action is the same as the agent in the subject noun phrase. This semantic concept of agency can be encoded in the lexical representation for any given event; so *write*, for example, would carry a feature AGENCY while *feel ill* would not. The control interpretation of *begin* is then triggered for verb phrases which have the feature *agency* and the raising interpretation of *begin* is triggered if that feature is not present.

In Russian, there are also the two types of aspectual verbs. Like English, depending on the complement VP, the aspectual verb can behave either as a control or a raising verb, and the same tests can be applied. In Russian, inceptives are expressed either with an aspectual verb, such as *nachat'* ('begin'), or by a prefix. Examples of such prefixed verbs are given in Figure 5.7. In this section examples are presented to show that there are examples of both control and raising verbs for both aspectual verbs and verbs with prefixed aspectual markers.

The aspectual verb *nachat'* ('begin') usually has the control reading (as in 5.36), while the prefixed inceptives can have either reading. Again, the distinction is one of agency and this can be indicated by the different subcategorisation for examples of control and examples of raising verbs. In the former, there is an AG-ROLE associated with the event which is token identical with the semantics of the subject noun phrase. For raising verbs this dependency is not required. This is illustrated in Figures 5.9 and 5.10.

- (5.36) a. Alyesha nachal pisat' dissertatsiyu.  
Alyesha began(PERF) writing thesis



where  $\square$  (the value of CONTENT for vp[gerVinf]) is

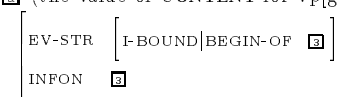
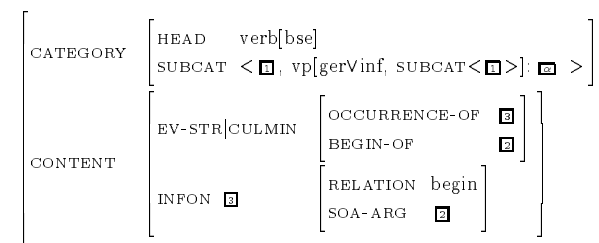


Figure 5.3: Feature structure for *begin* as a control verb



where  $\square$  (the value of CONTENT for vp[gerVinf]) is

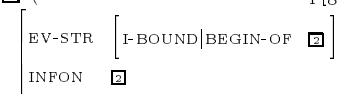


Figure 5.4: Feature structure for *begin* as a raising verb



- 'Alyesha began to write his thesis.'
- b. Masha zastavil emu nachat' pisat' dissertatsiyu.  
Masha forced(PERF) him to-begin to-write thesis  
'Masha forced him to begin writing his thesis.'
- (5.37) a. Alyesha pochuvstvoval sebya ploho.  
Alyesha felt(PERF) self ill  
'Alyesha felt ill.'
- b. \* Masha zastavil emu pochuvstvovat' sebya ploho.  
Masha forced(PERF) him to-feel(PERF) self ill  
\* 'Masha forced him to feel ill.'
- (5.38) a. Alyesha zagovoril.  
Alyesha begin-start(PERF)  
'Alyesha began speaking.'
- b. Masha zastavil emu zagovorit'.  
Masha forced(PERF) him to-speak-begin(PERF)  
'Masha forced him to begin talking.'

Both a raising and control analysis is therefore appropriate for aspectual verbs in Russian, and the correct form will be selected according to the agency of the VP complement; in actual examples, it is usually the complement form which is associated with *nachat'* ('begin'). For the prefixed verbs both the control and raising reading are found, and the analysis depends on the lexical entry for the given verb. Figures 5.3 and 5.4 show how the analysis for control and raising verbs varies in terms of the presence or absence of the feature AG-ROLE in the feature structure representation. In section 5.5.2.2 I give a similar analysis for Russian aspectual verbs, exemplified by *nachat'* ('begin/start'), and also show how the representation compares with that for prefixed verbs. The analysis of a prefixed verb as a control verb is given in Figure 5.9. At that point I also show how a raising verb of this type would be represented (Figure 5.10).

For aspectual verbs in both English and Russian, the control and raising analysis are appropriate depending on the event referred to. The two analyses do not however affect the analysis of the event structure which is the main focus of the analysis.

## 5.5 Analysis of aspectual verbs within the feature structure representation

### 5.5.1 Outline of the analysis

The difference between aspectual verbs and the verbal expressions considered so far is that they have a verbal complement, referring to an event which has a temporal relationship with the aspectual verb. The purpose of the analysis here is to show

(1) how the event reference of the aspectual verb and its verbal complement interact with each other, and (2) how the interaction between the two can be represented in terms of the event templates which have been motivated in the preceding chapters. This facilitates the same aspectual analysis for aspectual verbs as has been given for other verbs. As in previous chapters, a distinction is drawn between the template which is *referred to* (by the expression's aspectual class) and that part of it which is *explicitly described* (by viewpoint aspect). In the case of aspectual verbs, an event template is given both for the aspectual verb itself and also the verbal complement; the aspectual verb subcategorises for a verbal complement with a particular template, and the relationship between the two templates is given as part of the semantics of the aspectual verb. Syntactically, aspectual verbs are raising verbs, and this is accounted for in HPSG by indicating that the subject noun phrase of those verbs is token identical with the subject noun phrase of the complement verb (ie, the subcategorised for verb phrase). This account is given in Pollard and Sag 1994: 133. Information about the complement verb's template is conveyed by structure sharing, and by stating that the interpretation of, eg, *start* is such that it explicitly describes the occurrence of a *starting*-event and the start of the complement verb's event. Information about the **START-OF** this event is 'raised' to the sign for *start*, as will be seen in section 5.5.2.1.

The part of the template which is explicitly described is influenced by two factors (1) the semantics of the aspectual verb (eg, *start* explicitly describes the **START-OF** of the verbal complement's template), and (2) the viewpoint aspect of the aspectual verb (eg, the progressive of *start* explicitly describes the **PROC**-phase, ie the internal phase, of the **CULMIN**-phase corresponding to *start*). The interpretation of viewpoint aspect will be left aside in this section, but discussed in section 5.6. In the first instance, the analysis will be given with examples in the simple aspect for English and the perfective in Russian.

By building in an interpretation for aspectual verbs, a further level of analysis is effectively offered over and above the two components in Smith's theory. However, the same mechanisms that have been used so far are employed. The added dimension is achieved by showing the relationship between the aspectual verb's event template and that for the verbal complement. This is illustrated for each of the aspectual verbs in the following sections.

In sections 5.5.2.1–5.5.4.4, analyses are given for *start*, *begin*, *finish* and *stop*. In section 5.5.5 there is a discussion on constraints on the ordering of event phases, following on from the discussion in section 2.5.2 of Chapter 2. In this section, a new constraint is introduced for the interpretation of *stop*. In sections 5.5.6.1 and 5.5.6.2, analyses are given for *resume* and *continue*.

### 5.5.2 Analysis of *start*

#### 5.5.2.1 *Start*, *begin*

In section 5.3.1, I showed that *start* and *begin* both behave as culmination expressions. In this section, I shall discuss the syntax of these verbs further and propose

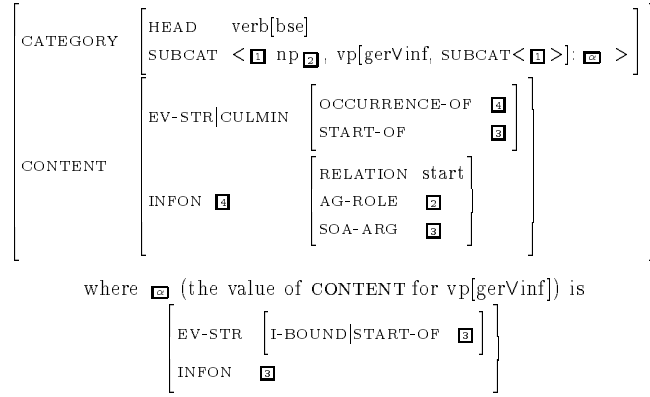


Figure 5.5: Feature structure for *start* (as a control verb)

an analysis for them in terms of the feature structure representation, by extending the analysis given up to this point.

The verbal complement which *start* and *begin* select for is either a gerund or an infinitive (vp[gerVinf]). The interpretation of *start* is encoded in the base lexical entry (Figure 5.5), and should be read as follows. The aspectual verbs *start* and *begin* explicitly describe the beginning of that event, ie the I-BOUND-phase. For example, (5.39) explicitly describes the I-BOUND-phase of a *letter-writing-event*. The CULMIN-phase of the aspectual verb's template therefore corresponds to the I-BOUND-phase of the complement verb. This is indicated by associating two values with CULMIN, one is [OCCURRENCE-OF  $\boxed{4}$ ] and the other is [START-OF  $\boxed{5}$ ], where  $\boxed{4}$  is the value of INFON for *start* and  $\boxed{5}$  is the value of INFON for the event referred to by the verbal complement. For (5.39), this indicates that the culmination expression *started* it is the occurrence of a *starting-event* and the start of a *writing-event*.

(5.39) John started writing the letter.

The simple past lexical rule (Figure 3.6) is applied to the base form of *start*, which behaves like any other culmination: a past participle can therefore be derived from the past participle lexical rule, and similarly a present participle can also be derived (for certain contexts). The full analysis of *started writing the letter* is shown in Figure 5.6, which combines with the subject noun phrase *John* to give the tree for (5.39).

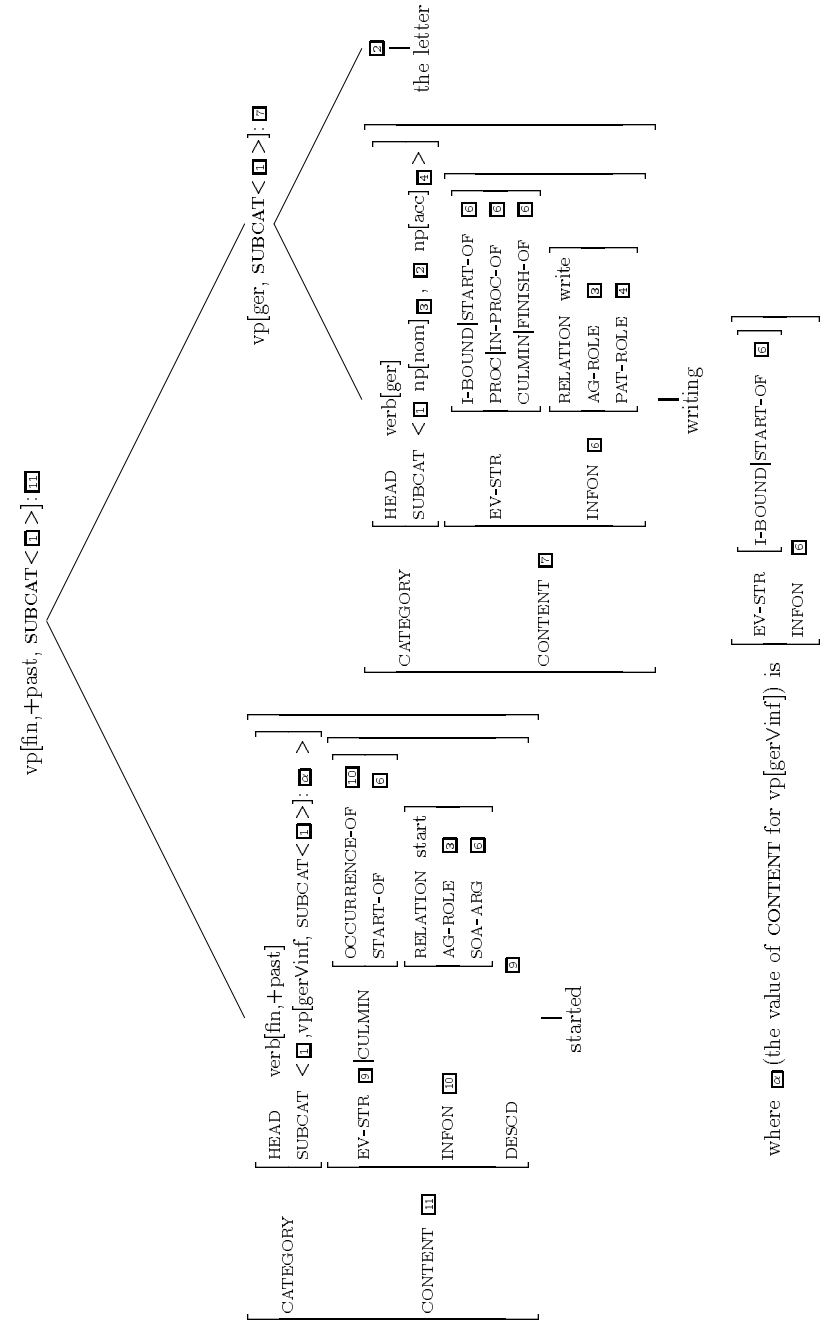


Figure 5.6: Tree for *started writing the letter*

Base form	Inceptive (PERF)	English
plakat'	zaplakat'	cry/start to cry
govorit'	zagovorit'	talk/start to talk
begat'	zabegat'	run/start running
smeyat'sya	zasmeyat'sya	laugh/start laughing
volnovat'sya	vzvolnovat'sya	be angry/become angry
chuvstvovat'	pochuvstvovat'	feel/start feeling
lyubit'	polyubit'	love/fall in love

Figure 5.7: Examples of inceptives in Russian, formed by a perfectivising prefix on the base form. *Za-* is the most productive inceptive prefix. Compare Forsyth 1970: 20; Wade 1992: 264.

### 5.5.2.2 The equivalent of *start* in Russian

In Russian, the inception of an event can be conveyed in two distinct ways. Either (1) with an aspectual verb *nachinat'*/*nachat'* plus imperfective infinitive (examples of which were given in section 5.3.1), or (2) with a perfectivised procedural form derived from the base with a prefix. For the latter, the prefix varies depending on the verb, but is often *za-* or *vz-*. An inceptive prefix is not available for all verbs, but it is reasonably productive. Taking the example of the process verb *plakat'*/*zaplakat'* ('to cry'), *Alyesha started to cry* can be rendered in two ways in Russian, as shown in (5.40).

- (5.40) a. Alyesha nachal plakat'.  
Alyesha started(PERF) to-cry  
'Alyesha started to cry.'
- b. Alyesha zaplakal.  
Alyesha start-cried(PERF)  
'Alyesha started to cry.'

The analysis of the aspectual verb plus infinitive (5.40a) can be modelled on the representation for *start* in section 5.5.2.1, with *nachat'* ('to start') behaving like a standard culmination expression (as was shown in section 5.3.1). For (5.40b), the perfective form must be derived from the base form of the verb. In this section I shall suggest an analysis for the inceptive perfectivising prefix by proposing a new lexical rule to derive this form from the base form *plakat'*. This rule would be restricted to a group of verbs marked as permitting an inceptive form, and the value of PHON is a function which would select for the relevant prefix. Examples of inceptives are given in Figure 5.7.

The lexical rule (Figure 5.8) is based on the lexical rule for the past perfective (Figure 3.19), but there are additional constraints on the application of this rule.

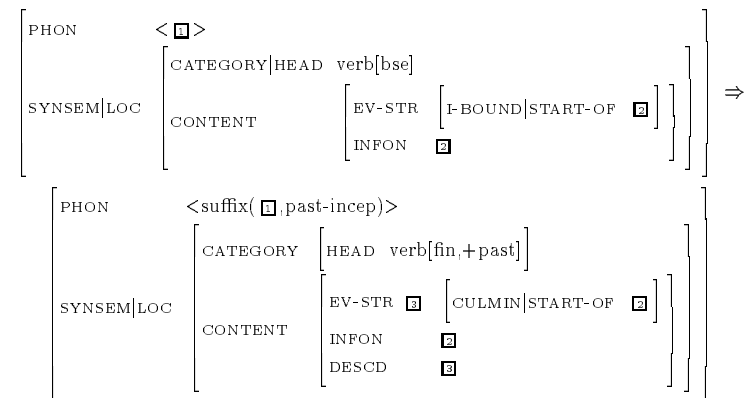


Figure 5.8: Lexical rule to derive the perfective inceptive form from the base form

Firstly, the base form must have an event template with at least an I-BOUND-phase (value of CONTENT|EV-STR on the left hand side). This implies that the verb refers to a durative event, because, by the ordering of phases a PROC-phase follows an I-BOUND-phase.<sup>2</sup> Secondly, a past inceptive phonological form must be available, constrained by the function which would derive the correct morphological form in the right hand side of the rule. The derived form consists of an event structure with different values, although the event reference (values of INFON) remains the same. The derived form is a culmination expression, which would normally carry the value [OCCURRENCE-OF  $[x]$ ], but in this case carries the value [START-OF  $[x]$ ], where  $[x]$  is the value of INFON, hence the interpretation is that the perfective culmination expression explicitly describes the start-of the referred to event. Although there may appear to be a mismatch between the event phase CULMIN and the feature relating that phase to the infon (here, START-OF), this is the correct interpretation. Compare the representation for *start* (Figure 5.5), where the path [CULMIN|OCCURRENCE-OF  $[x]$ ] indicates the culmination expression *start* ( $[x]$  is token identical with the infon for START), while the path [CULMIN|START-OF  $[x]$ ] indicates the fact that the aspectual verb is referring to the start of  $[x]$ , the complement verb's infon. The perfectivised inceptive is a culmination expression (hence the event phase CULMIN), but it refers to the start of an event rather than the occurrence of one.

The lexical rule (Figure 5.8) has introduced a notion of coercion into the analysis, by manipulating the information about the reference to the event. There is a coercion

<sup>2</sup>Note that in Figure 5.7 some of the inceptives are derived from states, and the prefix explicitly describes the start of the state. This lexical rule therefore needs modifying, indicating that the base form can additionally be a state: [EV-STR|STATE|OBTAINS  $[x]$ ].

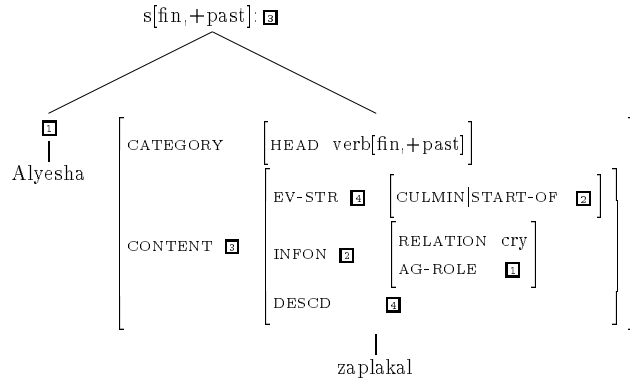


Figure 5.9: Tree for *Alyesha zaplakal* 'Alyesha started to cry'

from a durative expression (either process or culminated process) to a culmination expression. However, there is a consistency in the way this is derived. There is a single event reference (the value of **INFON**), and this remains constant, since this is essentially expressed in the root of the verb. This is in contrast to the aspectual verb and its complement where there are two event references which are cross referred to each other. Two essential features of the perfective aspect are (1) that it describes a completed action and (2) that the action may be instantaneous. The introduction of the event phase **CULMIN** is motivated by the fact that *zaplakal* ('started to cry'), *zasmeyalsya* ('started to laugh'), etc behave like culmination expressions in marking an instantaneous change of state. This event carries the perfective characteristics, namely completion and instantaneity. However, the durative nature of the *crying*-event can be inferred by the fact that it is the **START-OF** a *crying*-event which is being referred to and it is implied that a process and end of crying follows this.

The complete interpretation for (5.40b) is given in Figure 5.9. If the values of **DESCD** are compared for this example and that for Figure 5.6, it can be seen that the interpretation of viewpoint aspect is the same in each case<sup>3</sup>, but the underlying syntactic derivation is different. Therefore, the analysis reflects the common features of the aspectual interpretation while deriving the interpretations from the base forms of the individual lexical items.

In Figure 5.9 a control relationship is indicated between the agent of *cry* and the subject NP (*Alyesha*). This relationship does not hold for raising verbs, and some prefixed aspectual verbs behave as raising verbs (see examples 5.37 on page 157).

<sup>3</sup>These two examples should refer to the same event, ie either *writing a letter* or *crying* for easier comparison.

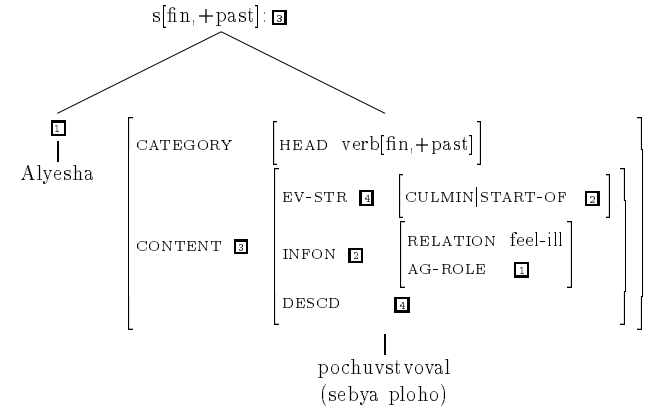


Figure 5.10: Tree for *Alyesha pochuvstvoval sebya ploho* 'Alyesha started feeling ill'

For these examples, the feature **AG-ROLE** is not specified as being token identical with the subject NP. A representation of (5.37) is given in Figure 5.10.

### 5.5.3 Observations about the analysis

Given the analysis for *start*, Russian *nachat'* and the Russian inceptive prefix given above, the representations for the other aspectual verbs can be modelled from these. The type of verb phrase which is subcategorised for varies (eg, *stop* and *finish* select for a gerundive complement only, and not an infinitival complement), and the aspectual interpretation obviously requires different event phases in the complement's event template. For the analysis of the Russian inceptive prefix and the analysis of *start*, it has been necessary to allow **CULMIN** to admit various values, and not just the value **OCCURRENCE-OF**. For inceptives, the value **START-OF** is also allowed, and as the other aspectual verbs are analysed, it will become clear that other values of **CULMIN** are allowed, ie **FINISH-OF**, **END-OF**, etc.<sup>4</sup> Allowing **CULMIN** to admit various values is central to the interpretation of aspectual verbs, and highlights the relationship between the abstract representation of event phases (which reflect the aspectual class of a phrase, in this case a culmination expression), and what that event phase is referring to in terms of events (ie, the values of **INFON**, which are token identical with the values of **OCCURRENCE-OF**, **START-OF**, etc).

The ontology developed for this analysis therefore allows certain parts of an event

<sup>4</sup>In a full HPSG analysis, the legal values for any feature can be constrained by typing features and specifying the allowable values of any given type in a type hierarchy.

template to be focussed on, because the values of the feature event phase can vary. This is indicated either by the semantic interpretation of the aspectual verb, or by a lexical rule deriving a perfectivised form in Russian. This analysis is similar to that for viewpoint aspect, in that a particular part of the event template of referred to. However, viewpoint aspect also features in the interpretation of complete sentences, identifying those parts of the template as being explicitly described.

In the following sections I shall give interpretations of other aspectual verbs, highlighting particular issues which arise for the examples in question.

## 5.5.4 Analysis of *finish* and *stop*

### 5.5.4.1 *Finish*

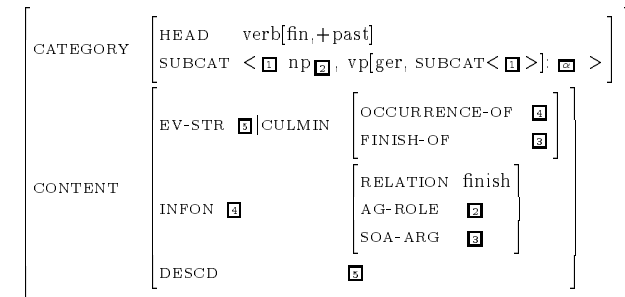
In section 5.3.2.1, I showed that *finish* behaves like a culmination expression, ie a *finishing*-event is perceived as an instantaneous event. There was some discussion about the perceived extent of such an event in some contexts, and this seems to be related to the fact that the latter part of a **PROC**-phase may be perceived as being related to a *finishing*-event. Since the internal structure of a culmination expression can be exposed in certain contexts, a **PROC**-phase is available for reference when necessary, allowing for interpretations of *finish* as having duration. *Finish* explicitly describes the **CULMIN**-phase of a culminated process expression (as was shown in section 5.3.2.1), and this phase is represented as being instantaneous in the ontology, since it refers to a change of state from the process of an event to its consequent state.

The subcategorised for verb phrase must therefore include a template with at least a **CULMIN**-phase, and also a **PROC**-phase (which temporally precedes **CULMIN** according to ordering constraints), restricting valid verbal complements to culminated process expressions.

Unlike *start* and *begin*, *finish* does not subcategorise for an infinitival complement, only a gerundive one, as (5.41) show. *Finish* generally behaves as a control verb.

- (5.41) a. John finished writing the letter.  
b. \*John finished to write the letter.

The sign for *finished* (derived by the simple past lexical rule from base form of *finish*) is given in Figure 5.11, and the complete tree for (5.41a) in Figure 5.12. *Write* is the verbal complement, and its event template fulfils the subcategorisation requirement of *finish* by containing at least a **PROC**- and a **CULMIN**-phase. The example sentence is in the simple past, so the whole of the event template of the main verb is explicitly described ( $\boxed{\text{Q}}$ ). This refers to a **CULMIN**-phase indicating the **OCCURRENCE-OF** a *finishing*-event and the **FINISH-OF** a *writing*-event, ie the finish of John's writing the letter is complete, implying that the whole of the *letter-writing*-event is complete.



where  $\boxed{\text{Q}}$  (the value of **CONTENT** for  $\text{vp}[\text{ger}]$ ) is at least

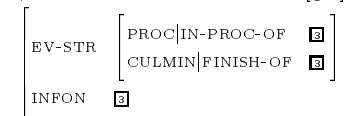


Figure 5.11: Feature structure for *finished*

### 5.5.4.2 The equivalent of *finish* in Russian

Turning again to a Russian example, the aspectual verb *konchat'/konchit'* ('to finish') subcategorises for an imperfective infinitive (and also, like English, a culminated process expression), the **CULMIN**-phase of which is explicitly described by the aspectual verb. Examples are given in (5.42) and (5.43a). The feature structure representation is constructed following the pattern for *finished writing the letter* (Figure 5.12), and I will therefore not give a tree representation for this sentence.

Like Russian inceptives, there are some perfectivising prefixes which indicate a terminative reading. This procedural meaning is not as productive as the inceptive one is, but a clear example is (5.43b). Other examples are given in Figure 5.13.

- (5.42) Alyesha konchil stroit' dachy.  
Alyesha finished(PERF) build dacha  
'Alyesha finished building the dacha.'
- (5.43) a. Vadim konchil pisat' pis'mo.  
Vadim finished(PERF) write letter  
'Vadim finished writing the letter.'
- b. Vadim dopisal pis'mo.  
Vadim finished-write(PERF) letter  
'Vadim finished writing the letter.'

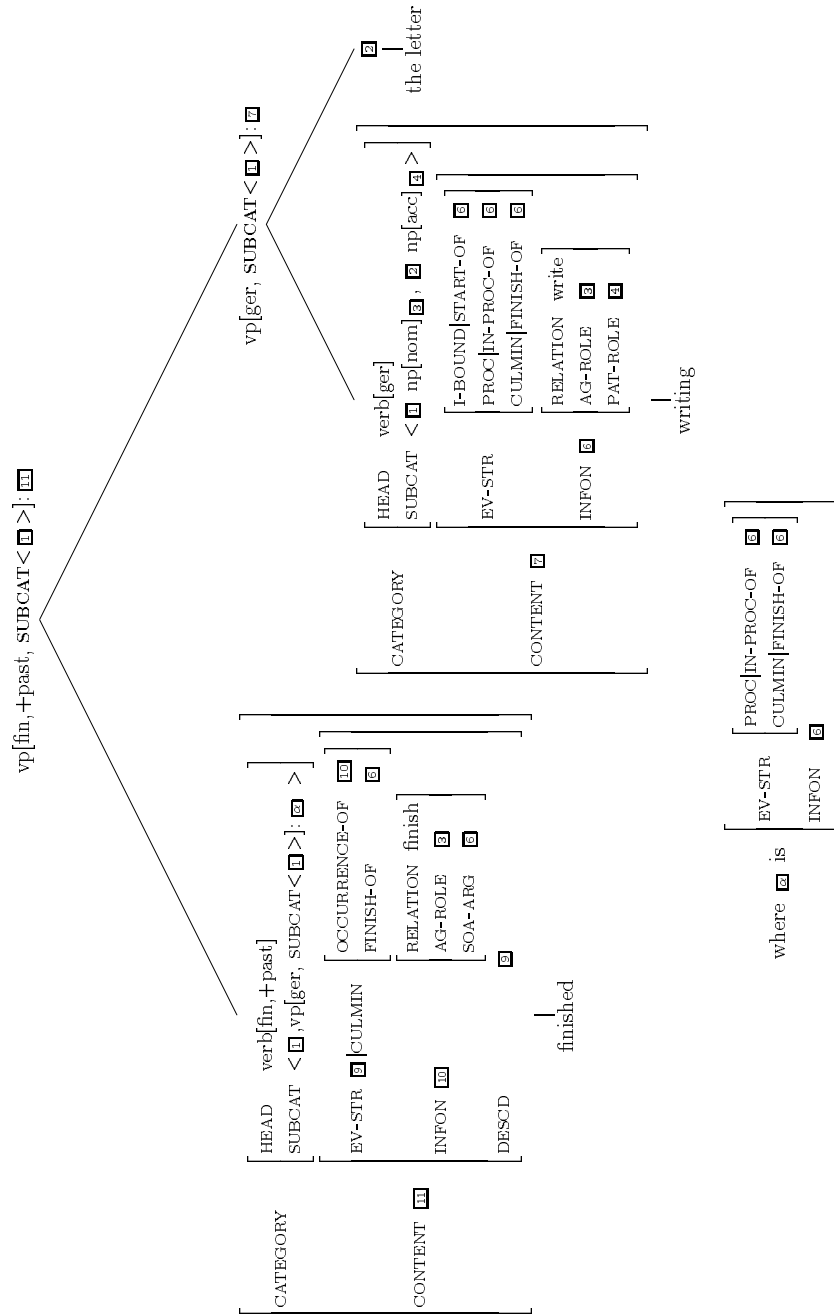


Figure 5.12: Tree for *finished writing the letter*

Base form	Terminative (PERF)	English
pisat'	dopisat'	write/finish writing
chitat'	dochitat'	read/finish reading
(govorit'sya)	dogovorit'sya	come to an agreement
rabotat'	otrabotat'	work/finish, eg a shift
goret'	Svechi dogoreli.	'The candles have burned down.'

Figure 5.13: Examples of terminatives in Russian, formed by a perfectivising prefix on the base form, usually formed by prefixes *do-* (which has an underlying spatial meaning: 'as far as, up to') and *ot-*. Compare Forsyth 1970: 22; Wade 1992: 275.

A lexical rule is required to derive these perfective forms, where the base form must be a culminated process expression, ie has at least a **PROC-** and a **CULMIN**-phase, as in (5.44a). The resulting value of **CONTENT** for *dopisat'* derived by the lexical rule has an **EV-STR** of value **CULMIN** which is explicitly described. And this **CULMIN** has the value **[FINISH-OF  $\boxed{6}$ ]**, where  $\boxed{6}$  refers to the infon for *write*, given in (5.44b). Compare the lexical rule for inceptive, Figure 5.8. The other phases of the aspectual class (eg, for *write*) do not appear in the representation but must be inferred by interpretation of the ordering of phases. However, this allows the whole of the event template to be explicitly described (ie, the value of **CULMIN**, indicated by **DESCD**), reflecting the correct interpretation of the perfective, without losing the intuition that the sentence refers to an underlying event which has duration (ie, the *writing-event*).

$$(5.44) \quad \begin{array}{l} \text{a.} \\ \left[ \begin{array}{c} \text{EV-STR} \quad \left[ \begin{array}{c} \text{PROC|IN-PROC-OF} \quad \boxed{6} \\ \text{CULMIN|FINISH-OF} \quad \boxed{6} \end{array} \right] \\ \text{INFIN} \quad \boxed{1} \quad \left[ \begin{array}{c} \text{RELATION write} \\ \text{AG-ROLE} \quad \boxed{2} \\ \text{PAT-ROLE} \quad \boxed{3} \end{array} \right] \end{array} \right] \\ \text{b.} \\ \left[ \begin{array}{c} \text{EV-STR} \quad \boxed{2} \quad \left[ \begin{array}{c} \text{CULMIN|FINISH-OF} \quad \boxed{6} \end{array} \right] \\ \text{INFIN} \quad \boxed{1} \quad \left[ \begin{array}{c} \text{RELATION write} \\ \text{AG-ROLE} \quad \boxed{2} \\ \text{PAT-ROLE} \quad \boxed{3} \end{array} \right] \\ \text{DESCD} \quad \boxed{6} \end{array} \right] \end{array}$$

### 5.5.4.3 Inferences drawn from the representation

Recall that the Russian perfective can explicitly describe either the whole of the event template, or the CONSEQU-STA-phase. The complete interpretation for (5.43b) is given in Figure 5.14 and will be compared with the representation for (5.45a), in Figure 5.15, repeated from Figure 3.20. Both expressions refer to a *letter-writing*-event, but a different perspective is taken in each case. However, for both there is a valid inference that the letter is completed (ie that it has been written), and to that extent (5.43b) and (5.45a) can refer to the same state of affairs. See (5.45).

- (5.45) a. Vadim napisal pis'mo → Vadim had written the letter.  
 Vadim wrote(PERF) letter  
 'Vadim wrote the letter'  
 or 'Vadim had written the letter.'
- b. Vadim dopisal pis'mo → Vadim had written the letter.  
 Vadim wrote letter  
 TERMIN(PERF)  
 'Vadim finished writing the letter'  
 or 'Vadim had finished writing the letter.'

Comparing the representations reveals that the interpretation of viewpoint aspect reflects this inference (there is a path [DESCD|CONSEQU-STA] in both sentences). Also, for both sentences, the path CULMIN|FINISH-OF is explicitly described, although for (5.45a) the other event phases of the *writing*-event are also explicitly described. The similarities in the interpretations highlight the similarities of meaning of these two sentences. However, the interpretations also differ in subtle ways, capturing the intuitively different interpretations which the two sentences carry.

These interpretations indicating the correct inferences have been constructed from the underlying event ontology motivated as event phases and event templates, and the generalised interpretation of viewpoint aspect and aspectual verbs. Inferences which hold for certain sentences form the basis for judgements about aspectual interpretation, and any analysis would be expected to reflect these inferences.

### 5.5.4.4 Stop

In section 5.3.2.2, I showed that *stop* is a culmination expression, and its representation is similar to *start* and *finish* in that the template for *stop* refers to both the *stopping*-event, and one of the phases of the template for the verbal complement. *Stop* refers to an F-BOUND-phase, marking the end of a PROC-phase, and the event referred to by the verbal complement is a durative event (ie, process or culminated process expression). If the complement verb refers to a process event, then the final bound is already available and can be picked out by the sign for *stop*. If the complement verb refers to a culminated process, then *stop* refers to a final bound which occurs before the culmination of the event, and therefore during the PROC-phase; the *stopping*-event acts to curtail the PROC-phase, and the CULMIN-phase does not

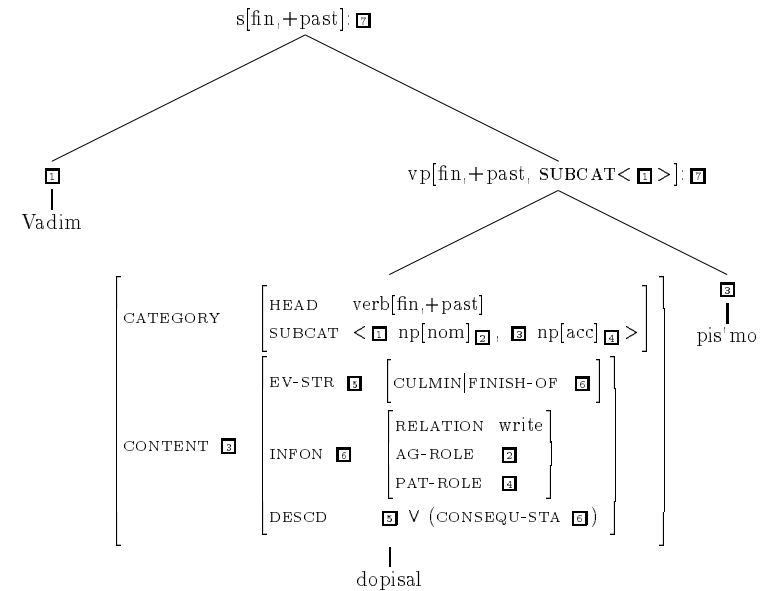


Figure 5.14: Tree for *Vadim dopisal pis'mo*

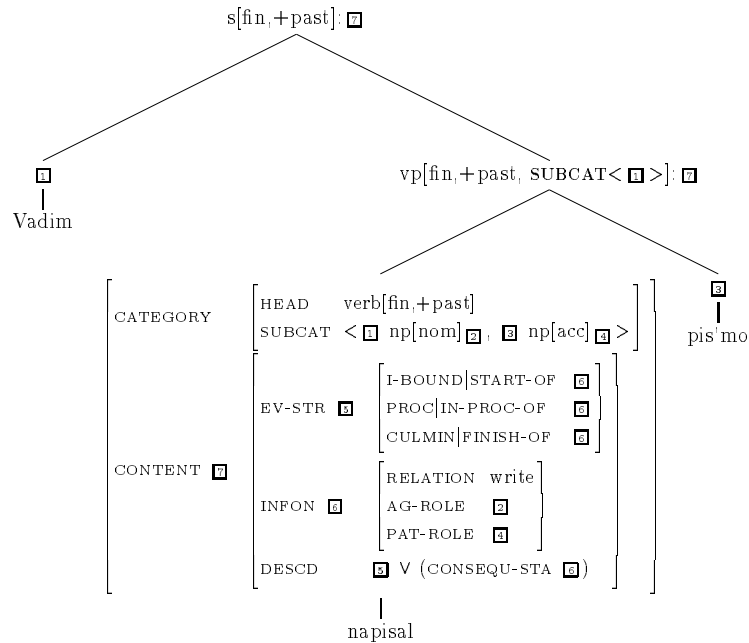


Figure 5.15: Tree for *Vadim napisal pis'mo* 'Vadim wrote the letter' or 'Vadim had written the letter'. Repeated from Figure 3.20

take place: *John stopped writing the letter* explicitly describes an event where John is in the process of writing a letter but has not yet finished it; he stops the process of writing the letter, and the process of writing the same letter may be resumed again, and again curtailed right up until it is completed (ie, until the CULMIN-phase is explicitly described).

The sign for *stop* will have to capture this difference between processes and culminated processes. For processes the F-BOUND is available in the event's template. For culminated processes an F-BOUND has to be invoked, and specified as occurring before the CULMIN-phase with the effect of prematurely halting a process phase leading up to a CULMIN-phase. This specification is represented in terms of an additional constraint on the ordering of event phases, which is discussed in detail in section 5.5.5.

The common feature shared by process and culminated process expressions are the I-BOUND- and PROC-phases. For this analysis, the event templates of the verbal complement must contain at least a PROC-phase, which—by the constraints C1 and C2 in section 2.5.2—is bounded by an I-BOUND- and either an F-BOUND- or a CULMIN-phase, ie *stop* selects for either a process or culminated process expression. The interpretation of *stop* is such that it explicitly describes the occurrence of (OCC-OF) a *stopping*-event, and the end of (END-OF) the complement verb's event. The sign for *stopped* (after application of the simple past lexical rule) is given in Figure 5.16. *Stop* behaves both as a control and a raising verb depending on the agency nature of its verbal complement; in the examples given here, *stop* is presented as a control verb.

The tree for the complete sentence (5.46) is given in Figure 5.17.

(5.46) John stopped writing the letter.

This value for CONTENT is derived by from sign for *stopped* (Figure 5.16) which subcategorises for the gerund *writing*. The final value of EV-STR|CULMIN indicates that there is an occurrence of a *stopping*-event, and that this is the end of a *writing*-event. The fact that *write* is a culminated process expression can be inferred from that verb's lexical entry, the values of EV-STR for *writing* (ie, the PROC-phase is flanked by an I-BOUND- and a CULMIN-phase. The interpretation of (5.47) must then be made with reference to the constraints on the ordering of phases. A new constraint is introduced in section 5.5.5 to indicate that END-OF occurs prior to the FINISH-OF an event, and therefore the CULMIN-phase [CULMIN|FINISH-OF] cannot be inferred as having occurred from (5.46). Such a reference to an event is interpreted as curtailing the PROC-phase before the CULMIN-phase is reached.

(5.47) 

END-OF	RELATION	write
	AG-ROLE	john
	PAT-ROLE	the letter

The PROC-phase is curtailed by the F-BOUND-phase, either temporarily or for good. A process can be interrupted at any time, and in this sense it can happen arbitrarily. This contrasts with CULMIN-phases which can only occur at the



Figure 5.16: Feature structure for the simple past *stopped*

point that a culminated process is actually complete. Smith (1991) distinguishes these endpoints as natural (my CULMIN-phase) and arbitrary (my F-BOUND-phase). This interpretation of the aspectual verb *stop* illustrates how Smith's terminology is relevant to the analysis developed in this chapter. The simple past form *stopped* (Figure 5.16) is similar to that for *started* and *finished*, except that the culmination expression *stopped* explicitly describes the end of the subcategorised-for gerundive complement. So, there is not a requirement that the complement of *stop* contains an F-BOUND-phase, but the interpretation introduces reference to one (by the feature END-OF, which is the value of F-BOUND) if one is not available for explicit reference.

If the complement verb refers to a process event, then its template will include a path [F-BOUND|END-OF], whose value will be the event's infon.

Again, Russian has a construction parallel to the English *stop*. The aspectual verb *perestavat'*/*perestat'* ('to stop') takes an imperfective infinitive as its verbal complement, the F-BOUND-phase of which is referred to by the aspectual verb. Some event references have a particular lexical reference, like *to stop* or *give up smoking* which refers to the stopping point of a process of smoking; in Russian, *brosit' kurit'* ('to give up smoking') refers to the stopping point of a process of smoking referred to by the process expression *kurit'* ('to smoke').

### 5.5.5 Ordering of event phases

From the preceding discussion, it is clear that there a further constraint on the ordering of phases is required to supplement those given in section 2.5.2. The inter-

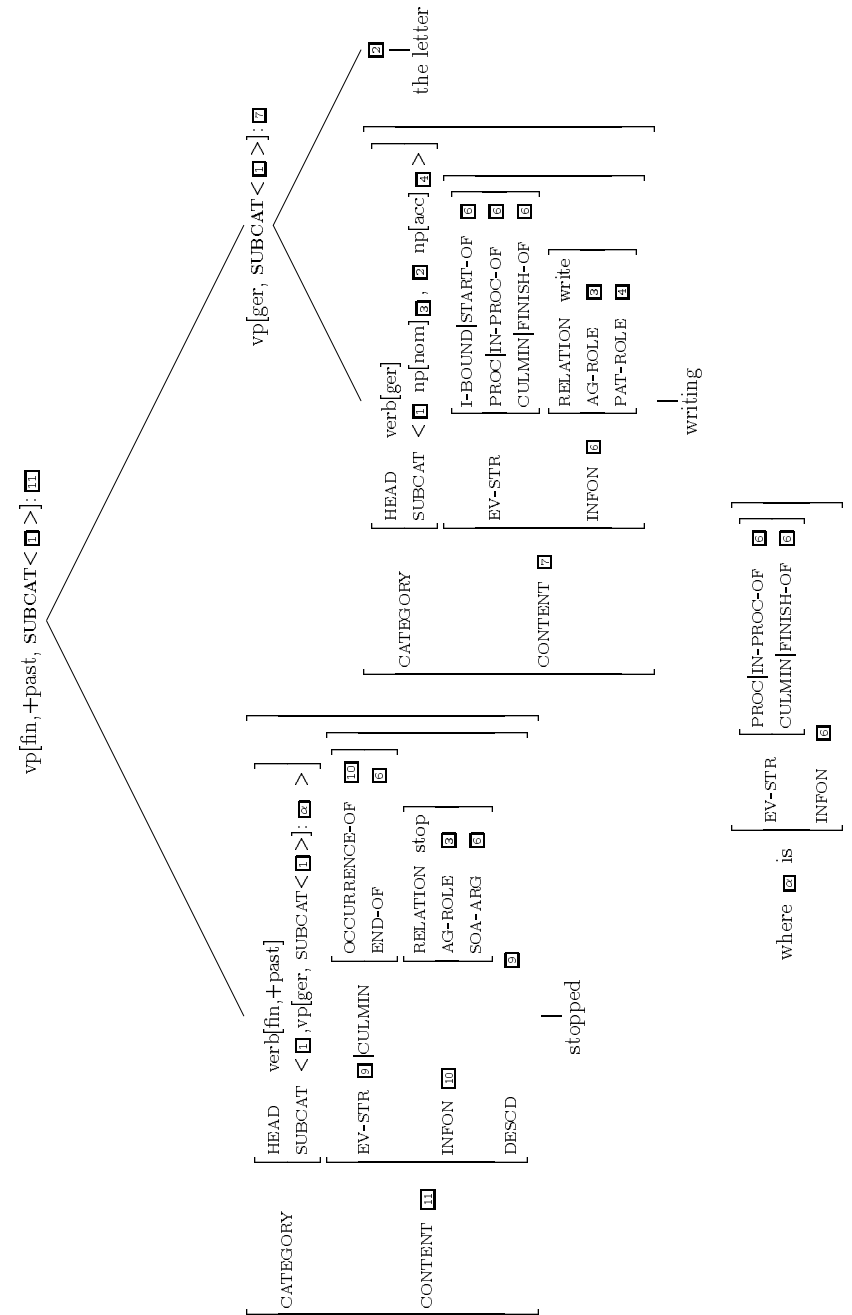


Figure 5.17: Tree for stopped writing the letter

pretation of *stop* has introduced a structure which has reference to both an F-BOUND- and a CULMIN-phase, and therefore a constraint is needed to indicate the temporal relationship between these two phases.

In section 2.5.2 of Chapter 2, constraints were given for the event templates introduced up to then. There were seven constraints, such as the fact that an I-BOUND-phase temporally precedes a PROC-phase (C1), or that an F-BOUND-phase is followed by a STATE-phase (C5), whereas a CULMIN-phase is temporally followed by a CONSEQU-STA-phase (C4). The constraint in this section is additional to those given in Chapter 2.

The following constraint indicates what further temporal restrictions hold between event phases, producing the correct interpretation of *stop* with culminated process expressions in the verbal complement, eg for *John stopped writing the letter*, represented in Figure 5.17.

C8 If EV-STR (for the complement verb phrase) contains the values

[PROC|IN-PROC-OF  $\square$ ] and [CULMIN|FINISH-OF  $\square$ ],

and DESC contains the value

CULMIN  $\left\{ \begin{array}{l} \text{END-OF } \square \\ \text{OCC-OF } \square \end{array} \right\}$

where  $\square$  refers to the values of INFON of the event referred to by the verbal complement, and  $\square$  refers to the INFON of *stop*, then:

CULMIN|END-OF  $\square$  < CULMIN|FINISH-OF  $\square$

If [CULMIN|END-OF  $\square$ ] temporally precedes [CULMIN|FINISH-OF  $\square$ ] and the former is explicitly described by the sentence, then it can be inferred that the letter is not finished. This is borne out by the data:

(5.48) John stopped writing the letter  $\nrightarrow$  John finished writing the letter

(5.49) John stopped writing the letter  $\nrightarrow$  John wrote the letter

A reference in the discourse to the resumption of the event—or an event of the same type—is necessary, before *John finished writing the letter* can be true.

- (5.50) a. John stopped writing the letter at two and finished writing it at three.  
(if this sentence is felicitous, then a resumption between 2 and 3 is implied)
- b. John stopped writing the novel in November. He started it again after Christmas and finished writing it by Easter.

## 5.5.6 Analysis of *resume* and *continue*

### 5.5.6.1 *Resume, start again*

If the CULMIN-phase of a culminated process expression is not reached, there is a potential for that event to be resumed at some point in the future. The aspectual verbs *resume* and (the phrase) *start again* indicate a viewpoint aspect whereby an event which has previously stopped is resumed. This was shown in section 5.3.3.1. The representation for these aspectual verbs is, therefore, the same as that for *start*, but there is an inference, within the current discourse context, that an event of the same type and with the same participants, has already taken place.

In Russian, the equivalent of *resume* is *prodolzhat'/'prodolzhit'*, which means *continue* in the imperfective aspect, and *resume* in the perfective. It takes a verbal complement in the imperfective infinitive. *Prodolzhat'/'prodolzhit'* is similar to *continue* in English which can also be interpreted either as a process or a culmination expression, depending on context, as was shown in section 5.3.3.2.

### 5.5.6.2 *Continue*

In section 5.3.3.2 it was suggested that *continue* should be analysed as a culmination expression which refers to either the I-BOUND-phase or the PROC-phase of the complement verb. With this analysis, *continue* can be interpreted as indicating either the ongoing nature of an event, or the resumption of it (assuming another occurrence of that event can be inferred within the context). The verb subcategorises for a gerundive or infinitival complement which is a durative expression, ie with an EV-STR with at least the value PROC. The sign for *continue* is given in Figure 5.18. It follows the same pattern as the representations for other aspectual verbs, in that the CULMIN-phase corresponds to the aspectual class of the aspectual verb, and the feature value associated with that phase refers to the nature of the action of the aspectual verb (OCCURRENCE-OF) and the verbal complement (IN-PROC-OFVSTART-OF), thus indicating the connection between the two event referents. This representation of *continue* is not complete, since the START-OF an event in this context is in fact the restart of an event which has already been stopped in the current discourse context. In a more detailed discourse-based representation, this inference would be incorporated into the analysis.

## 5.6 Aspectual verbs and viewpoint aspect

In this chapter I have given representations of sentences containing aspectual verbs, showing how an interpretation for them can be derived from the event templates motivated in Chapter 2, and modelled on the interpretation of viewpoint aspect in Chapter 3. All the examples have been given in the simple past (for English) or perfective (for Russian), and in this section I shall consider what interpretations would be derived for aspectual verbs in the perfect and progressive (for English), or the imperfective (for Russian).

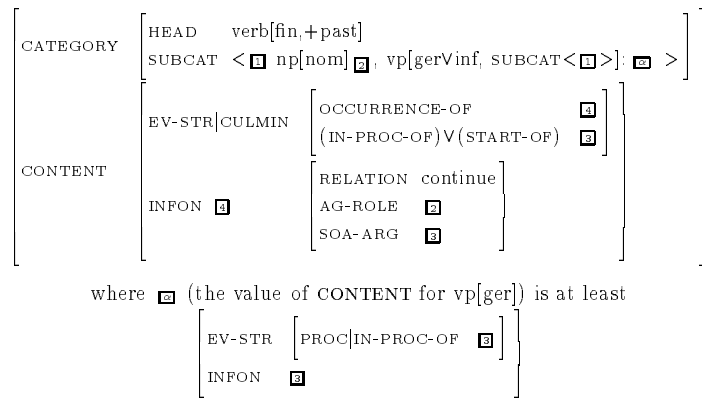


Figure 5.18: Feature structure for *continue*

The interpretation of aspectual verbs in the progressive or perfect can be derived in exactly the same way as for any other verb: they have an underlying aspectual class, and the present or past participle rules apply in just the same way. Similarly, for Russian, the lexical rules to derive the perfective and imperfective aspects apply to aspectual verbs in the same way. The main difference for aspectual verbs is that there is reference to two event templates: that for the aspectual verb and that for the complement verb. Through structure sharing in the feature structure representation, the relationship between the event referents can be given in a principled way.

The analysis of examples of aspectual verbs in sentences using various viewpoint aspects raises some interesting questions about the relationship between event phases and the events they refer to. Such sentences often provide an alternative way of referring to part of an event. For example, *John had started writing the letter* can describe an event where the following may be true: *John was writing the letter*. However, John does not *have* to be writing the letter for it to be true, since he could have stopped writing it again. The use of aspectual verbs and viewpoint aspect allow events to be referred to from slightly different points of view; their interpretations interact to provide the language user with means to describe events with subtle nuances. The purpose of the analysis developed in this thesis is to show how the interpretations can be composed from individual phrases in a sentence, and show in a principled way how different aspectual phenomena interact.

In this section, rather than running through a list of representations for various aspectual verbs in different viewpoint aspects, I shall compare pairs of examples. First I indicate what inferences are expected to hold between the examples. I then show that these inferences follow from the feature structure representations for those

sentences. This requires considering which event phases are explicitly described, inferring which phases follow those explicitly described by interpreting the constraints, and then comparing the results for the pairs of examples.

### Example 1

The analysis makes certain predictions about whether or not two sentences explicitly describe the same part of an event. In section 5.5.4.1, I showed that, by the consequent state reading, (5.51a) and (5.51b) (repeated from that section) both refer to the same state of affairs. However, by the completed event reading (5.51a) explicitly describes the whole of the letter writing event, while (5.51b) explicitly describes just the CULMIN-phase of that culminated process expression. The event in the real world to which these sentences refer is inferred as being complete in both cases. While the analysis indicates that different parts of the template are explicitly described, in both cases the correct inference can be drawn that the whole of the event has taken place.

- (5.51) a. Vadim napisal pis'mo → Vadim had written the letter.  
Vadim wrote(PERF) letter  
'Vadim wrote the letter'  
or 'Vadim had written the letter.'
- b. Vadim dopisal pis'mo → Vadim had written the letter.  
Vadim wrote letter  
TERMIN(PERF)  
'Vadim finished writing the letter'  
or 'Vadim had finished writing the letter.'

### Example 2

Similar inferences can be drawn between other sets of examples, and I shall show that these inferences can be drawn from the feature structure representations. For example, (5.52a) shows that if the sentence *John had started writing the letter* is true then it is implied that at some point it was also true that *John was writing the letter*. (5.52b) is a parallel example for Russian.

- (5.52) a. John had started writing the letter → John was writing the letter  
(at some point)
- b. Alyesha nachal pisat' pis'mo. → On pisal pis'mo.  
Alyesha started to-write letter He wrote letter  
(PERF) (IMP)  
'Alyesha (had) started writing the letter.' → 'He was writing the letter'  
(at some point).

These inferences are drawn from the interpretation of viewpoint aspect for each of the examples, and the temporal interaction between the event phases, determined

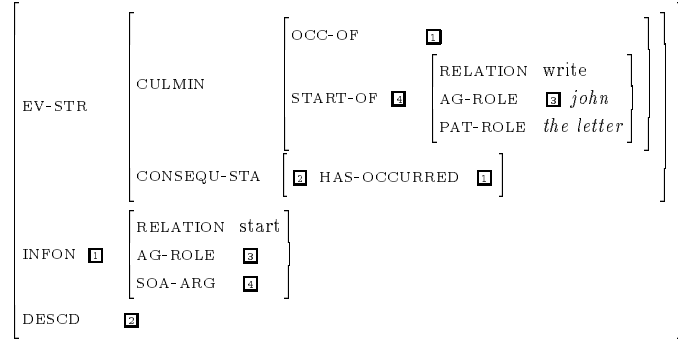


Figure 5.19: The values of CONTENT for *John had started writing the letter*.

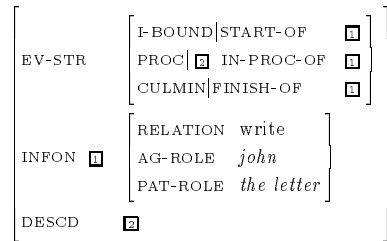


Figure 5.20: The values of CONTENT for *John was writing the letter*.

by the ordering constraints discussed in section 2.5.2. Figures 5.19 and 5.20 show the values of CONTENT for the examples in (5.52). The event phases which appear in these figures are given in (5.53) and (5.54). I give the values of the event phases, and also the temporal ordering of these phases (indicated by '<') which can be inferred by the constraints in section 2.5.2 of Chapter 2. In (5.53), the fact that a CONSEQU-STA-phase follows a CULMIN-phase is determined by C4. In (5.54), the temporal ordering of phases is inferred from constraint C1.

$$(5.53) \quad \text{CULMIN} \left[ \begin{array}{l} \text{OCC-OF|RELN } \text{start} \\ \text{START-OF|RELN } \text{write} \end{array} \right] < \text{CONSEQU-STA} \left[ \boxed{7} \text{ HAS-OCCED|RELN } \text{start} \right]$$

$$(5.54) \quad \text{CULMIN} \left[ \text{START-OF|RELN } \text{write} \right] < \text{PROC} \left[ \boxed{4} \text{ IN-PROC-OF|RELN } \text{write} \right]$$

(Note that  $\boxed{7}$  indicates what part of the event template the sentence explicitly describes.)

In both examples, there is an instance of the starting of a writing event (and a more complete representation would show that it was *John* who started writing *the letter*), and what is explicitly described (the value of  $\boxed{7}$  in each case) is a period of time following this event, although the precise time or extent of that time is unspecified. It can therefore be inferred that the examples in (5.52) might refer to the same situation. This is the case for the discourse in (5.55).

(5.55) John had started writing the letter. He was writing it for half an hour before he realised he didn't know the address to send it to.

However, the consequent state of an event (in this case the start of a letter writing event) can extend for an indefinite period, and it does not necessarily follow that *John was writing the letter* at the time referred to by *John had started writing the letter*. This is suggested in the discourse in (5.56), where there is a further inference that, having started the letter, John stopped writing it at some point after that.

(5.56) John had started writing the letter, but he hadn't looked at it for a few days.

Both these readings can be inferred from the relationships between event phases given in (5.53) and (5.54): both  $[\text{CONSEQU-STA}|\boxed{7} \text{ HAS-OCCED|RELN } \text{start}]$  and  $[\text{PROC}|\boxed{4} \text{ IN-PROC-OF|RELN } \text{write}]$  temporally succeed  $[\text{CULMIN}|\text{START-OF|RELN } \text{write}]$ , but it is not specified whether they overlap temporally.

### Example 3

Taking another example of aspectual verbs in the perfect aspect, the following inferences do not hold (indicated by ' $\nrightarrow$ ')

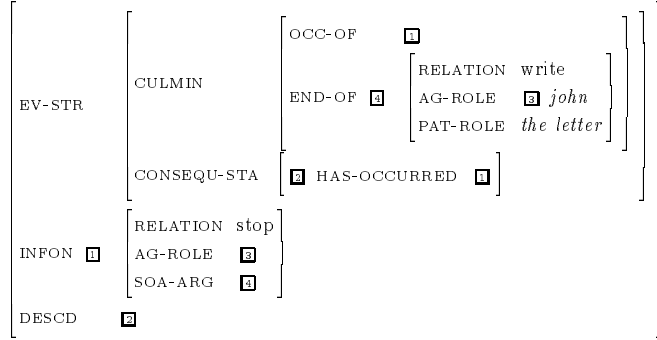


Figure 5.21: The values of CONTENT for *John had stopped writing the letter*.

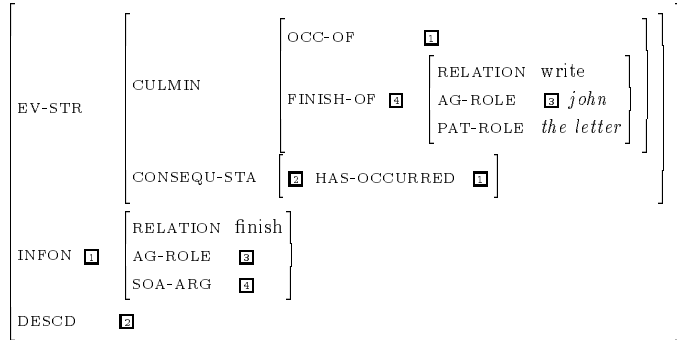


Figure 5.22: The values of CONTENT for *John had finished writing the letter*.

- (5.57) a. John had stopped writing the letter  $\nrightarrow$  John had written the letter  
b. John had stopped writing the letter  
 $\nrightarrow$  John had finished writing the letter

The values of CONTENT for (5.57) are given in Figures 5.21 and 5.22. As for the previous examples, I have factored out the temporal ordering of the event phases for (5.57a) and (5.57b), given in examples (5.58) and (5.59).

$$(5.58) \quad \text{CULMIN} \left[ \begin{array}{l} \text{OCC-OF|RELN } \text{stop} \\ \text{END-OF|RELN } \text{write} \end{array} \right] < \text{CONSEQU-STA} \left[ \boxed{1} \text{ HAS-OCCED|RELN } \text{stop} \right]$$

$$(5.59) \quad \text{CULMIN} \left[ \begin{array}{l} \text{OCC-OF|RELN } \text{finish} \\ \text{FINISH-OF|RELN } \text{write} \end{array} \right] < \text{CONSEQU-STA} \left[ \boxed{1} \text{ HAS-OCCED|RELN } \text{finish} \right]$$

The index  $\boxed{1}$  indicates the phases (or parts of phases here) which are explicitly described. Constraint C8 (section 5.5.5) states that

$$(5.60) \quad \text{CULMIN|END-OF } \boxed{1} < \text{CULMIN|FINISH-OF } \boxed{1}$$

Thus, it can be inferred—in a case where  $[\boxed{1} \text{ HAS-OCCED|RELN } \text{stop}]$  refers to a time immediately following the *stop*-event—that the *writing*-event is not finished. Of course, over the course of time, the *writing*-event may be resumed and finished, and so there may be contexts where the inference does hold, but in those contexts the resumption of the writing event must also be inferred.

For example, the discourse in (5.61) seems incoherent (indicated by '!!').

- (5.61) !!John had stopped writing the letter. He was on this way to the post office to post it.

Usually one posts a letter when it is finished, so it seems strange for John to be going to post it having stopped writing it. Of course, he could be posting an unfinished letter, in which case the discourse is coherent; but still the lack of an inference between the sentences in (5.57b) is correct.

In (5.62) the discourse reference time is updated by temporal reference (*at lunchtime* and *by the evening*). In this case the consequences relating to having stopped writing the letter do not hold during 'the evening', and so the inference in (5.57b) would not be expected to hold. In this discourse, there is an inference that between lunch and evening John resumed writing the letter.

- (5.62) John had stopped writing the letter at lunchtime. By the evening he had finished it.

#### Example 4

This final example shows how an aspectual verb in the progressive is derived, and how this representation relates to reference to the event in the progressive without an aspectual verb.

- (5.63) a. John was finishing writing the letter  
 b. → John was writing the letter

The derivation for (5.63a) yields a value for **CONTENT** given in Figure 5.23. This can be compared with the values of **CONTENT** for (5.63b), given in Figure 5.24. Both sentences explicitly describe part of a **PROC**-phase (ie, the value of **DESCD** is **IN-PROC-OF**).

For (5.63a), it is the part of the **CULMIN**-phase of the finish of a *writing*-event which is explicitly described, derived by exposing the internal structure of the culmination expression *finish*. This implies that the *writing*-event is not complete, but it is in the latter stages of completion. For (5.63b) it is part of the **PROC**-phase of the *writing*-event which is explicitly described.

According to constraint C2, the **PROC**-phase of a culminated process expression precedes the **CULMIN**-phase. (5.63a) refers to the **CULMIN**-phase of the letter writing event (explicitly describing part of the process phase relating to this **CULMIN**-phase), and so temporally (5.63b) precedes (5.63a). However since the **CULMIN**-phase is not complete, there is an implication that the letter is still being written, although it is clearly the last part of the *writing*-event which is taking place.

## 5.7 Conclusions

In this chapter I have reviewed some approaches to accounting for aspectual verbs, and suggested how observations made can be incorporated into the analysis developed so far (section 5.2). Using similar tests to those in Chapter 2, I determined the aspectual class of the aspectual verbs discussed in this chapter (section 5.3). Aspectual verbs are associated with an event template, and they subcategorise for a complement verb which has its own template. There is a relationship between the event templates of these two verb phrases. The analysis, given in section 5.5, treats aspectual verbs in a similar way to viewpoint aspect in that part of the event structure of the complement verb is explicitly described by the aspectual verb. I develop an analysis which shows this relationship, and demonstrate how a similar representation can be given for Russian procedural verbs which also explicitly describe part of the event referred to. Russian procedural verbs were discussed in section 2.2.3.4 of Chapter 2. In this way, various categories of aspectual types are brought together into one analysis.

Examples of aspectual verbs are given in the simple aspect (in English) and the perfective (in Russian). In the final part of the chapter, I indicate how viewpoint aspect is applied to aspectual verbs. This leads to a discussion of what the temporal relationship is between two sentences referring to the same event but explicitly

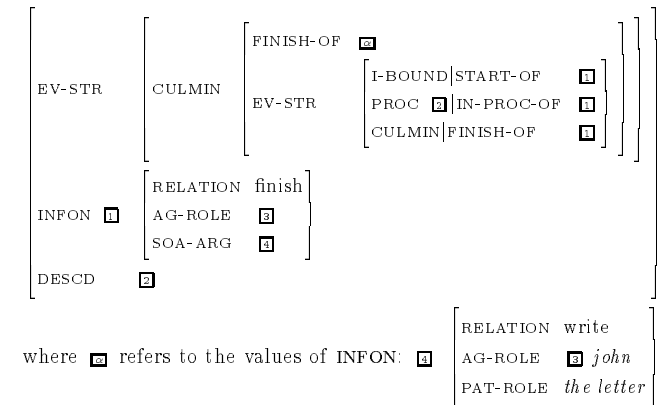


Figure 5.23: The values of **CONTENT** for *John was finishing writing the letter*.

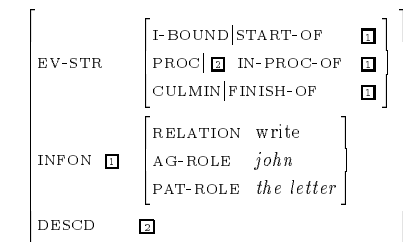


Figure 5.24: The values of **CONTENT** for *John was writing the letter*.

describing different parts of it. I discuss what kinds of inferences hold between such sentences.

Finally, in section 5.6, I showed that the analysis of aspectual verbs with any viewpoint aspect can be derived using the same principles as for other sentences. Therefore, the derivations given in Chapter 3 and Chapter 4 can also be applied to the data in this chapter. Reference to the correct part of the complement verb's event structure is made because the appropriate event phases are referred to through structure sharing in the feature structure analysis. Given the interpretations of aspectual verbs with various viewpoint aspects, inferences can be drawn about whether or not an event is complete, or what part of the event structure is explicitly described. Combined with the interpretation of the ordering of event phases, the analysis can be tested by showing whether certain relationships hold between any two sentences.

The fact that these inferences can be derived from the representation proposed in this thesis demonstrates that it provides a reasonably accurate reflection of how events are idealised, referred to and explicitly described by language users. The representation gives a unified analysis of event structure, viewpoint aspect and aspectual verbs.

## Chapter 6

## Conclusions

In this thesis I have shown that an account of aspectual class, viewpoint aspect and aspectual verbs can be expressed in a feature structure framework, presented in the spirit of the HPSG grammar formalism. I indicated how HPSG could be extended by incorporating new feature values to reflect the aspectual categories I introduced, and showed how they should be manipulated to give the correct interpretation of aspect.

The components of the analysis are built up in a principled way. In Chapter 2, a set of event phases are motivated and constraints on their ordering are given to produce event templates which represent the aspectual class of a phrase. The constraints add a temporal dimension to the analysis, indicating the temporal ordering of the event phases. The event templates reflect the aspectual class of a verb or verb phrase, and form the basis for the analysis of viewpoint aspect. In Chapter 3, I show that an interpretation of viewpoint aspect can be given whereby it explicitly describes a part of the event template. The analysis is a combination of accounts of aspect given by Smith (1991) and Moens (1987). I demonstrate how transitions in Moens' aspectual network correspond to the interpretation of viewpoint aspect given in this thesis. The analysis is cast in the feature structure framework, showing the relationship between the aspectual features and the syntax of the example sentences.

Given the event phases and interpretation of viewpoint aspect developed in Chapter 2 and Chapter 3, this approach to interpreting aspect is extended in Chapter 4 and Chapter 5 to account for observations made about culmination expressions and aspectual verbs.

The main claim in Chapter 3 is that the perfective viewpoint aspect explicitly describes the whole of the event referred to, or it explicitly describes the consequent state phase following that event. Both these interpretations reflect the main characteristic of the perfective as a completed event. In English, the simple and perfect aspects are differentiated by performing these respective functions. The Russian perfective, however, can carry either of these interpretations, and the analysis reflects this. The imperfective viewpoint aspect in Russian and progressive in English both explicitly describe part of the process event phase. For single event reference, if a process event phase (PROC-phase) is not available for reference, then the imperfective and progressive are not felicitous. This gives a uniform analysis of the imperfective

and progressive for single event reference.

In Chapter 4, I motivate the need to provide culmination expressions with a secondary level of structure which includes a process event phase (**PROC**-phase), thus giving an interpretation for culmination expressions in the imperfective and progressive. The secondary level of structure is restricted to certain contexts, and contrasts with the event structure of durative events (ie, process and culminated process expressions), for which the **PROC**-phase is always available. This representation of culmination expressions as referring to both punctual and durative events (depending on context) is motivated with linguistic data. It also lays the groundwork for extending the analysis of viewpoint aspect to aspectual verbs.

In Chapter 5, aspectual verbs are shown to categorise as culmination expressions, with a corresponding event template. Aspectual verbs subcategorise for a verbal complement which also has an associated event template. The analysis of aspectual verbs shows the relationship between these two event templates, and the event ontology motivated up to this point is used in making this analysis. Aspectual verbs explicitly describe certain of the event phases, like **I-BOUND**, **F-BOUND** and **CULMIN**. Since these phases are punctual, the primary interpretation of culminations is appropriate for aspectual verbs in the simple and perfective aspects. The secondary level allows interpretations to be given to aspectual verbs in the progressive and imperfective, while maintaining an analysis which shows the relationship between the event templates of the aspectual verb and the template of the verbal complement. A similar analysis is offered for Russian procedural forms which explicitly describe individual event phases. This analysis of aspectual verbs further substantiates the structure of event templates which has already been motivated by other linguistic data.

The thesis therefore offers a unified analysis of aspectual class, viewpoint aspect, aspectual verbs, and procedural meanings of Russian verbs which have an aspectual interpretation. The analysis provides interpretations which explicitly describe the appropriate part of the event template according to the viewpoint aspect of the sentence and the meaning of any aspectual verbs or procedural forms used. A detailed enough event ontology is motivated to achieve this.

The analysis also provides a basis with which to compare the aspectual categories in English and Russian, and this comparison could be extended to other languages. Smith makes an explicit comparison with French, Chinese and Navajo. The event templates and event phases proposed in the thesis provide a medium for comparing the viewpoint aspects. The English progressive and the Russian imperfective are shown to have the same interpretation for single event references. The simple and perfect in English are distinguished, and these viewpoint aspects correspond to the interpretation of the perfective in Russian. The event ontology presented in this thesis therefore provides the necessary underlying structures with which to interpret event reference in English and Russian.

Finally, certain inferences can be drawn between two sentences using different aspects but referring to the same event. The temporal relationships holding between those references to events are reflected in the analysis, and this is demonstrated at the end of Chapter 5. Although the analysis focuses on individual sentences, discussion

about inferencing between events indicates how the analysis could be used as one criteria for determining the coherence of a series of sentences. This suggests that the analysis could be employed as part of an analysis of discourse.

The analysis has been presented informally in terms of feature structures, but in the spirit of HPSG. Within the field of computational linguistics, there are grammar development environments in which the HPSG formalism suggested in this thesis could be implemented (eg, ALE, Carpenter 1993). Such an implementation should be able to derive the inferences discussed here, and ultimately predict what relationship holds between the parts (or whole) of events described in any two sentences.



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